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ROLE OF THE GENERAL PRACTITIONER IN PREVENTION OF BLINDNESS

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• *The relative importance of various causes of blindness has varied through the years. Since 1900 there has been a steady decline in the percentage of cases of blindness ascribed to infectious diseases, including gonorrhea. This decline is largely explained by the advent of antibiotics. Retrolental fibroplasia reached a peak in 1952 and declined promptly when it was recognized as a manifestation of oxygen poisoning. Cataract has increased steadily; treatment has improved, but the cause remains unknown and the number of people attaining the cataract age has increased. Corticosteroids have caused irreversible damage in some cases of herpes simplex of the cornea and are specifically contraindicated in that condition; they are valuable, however, in the prevention of sympathetic ophthalmia, which used to be a major risk after eye injuries. Trauma has continued to be an important cause of blindness; emphasis needs to be placed on protective measures and prompt treatment. Research on the ocular complications of systemic disease and on the etiology of glaucoma is particularly important because these two factors together still account for about one-fifth of all cases of blindness.*

Have the causes of blindness changed? The doctor in general practice realizes, just as does he who limits his work to the eye, that consideration of blindness is changing constantly. Yesterday some became blind for reasons seldom seen today. Tomorrow different causes of blindness may appear. It is for us to review conditions of yesterday in order to be prepared for tomorrow.

An astonishing improvement has been gained by the use of some of the new wonder drugs. Medicaments, including various sulfonamides, the antibiotics, and corticosteroids, have often prevented blindness due to infection, while improved methods of treatment have prevented many other possible causes of blindness. Yet at the same time these new drugs have brought dangers. Some of these dangers have been the systemic reactions such as blood dyscrasias, while in other instances when corticosteroids have been used in herpetic corneal disease, the end-result has not always been improvement. Instead, it may have been a large corneal scar, with marked loss of vision. Another instance of recent, dramatic change within medical practice has been the reduction of the amount of oxygen given to premature babies, because it has been found that high concentration of oxygen is responsible for retrolental fibroplasia.

Statistics

The blind population in the United States has been estimated in 1956 to be about 334,000 by the National Society for the Prevention of Blindness.[1] Each year some 27,000 more persons join that population. Their blindness has been defined as "economic blindness," with the best corrected vision in the better eye being 20/200 or less or with a good central vision but marked constriction of the visual fields. Although, because of some deaths, 27,000 persons are not added yearly to the original 334,000, the problem still is one about which the physician in general practice may well be concerned.

For this paper, data from 1900 on have been obtained. However, because of the lack of an exact classification of the causes of blindness in the early reviews on the subject, four surveys have been used for comparison: these cover the years 1940, 1950, 1939, and 1951 through 1955. Data regarding the estimated number of blind in the United States in each of the various classifications of the causes of blindness in 1940 and in 1950 came from material from the National Society for the Prevention of Blindness.[2] The data for 1939 came from a survey of the recipients of assistance to the blind in the state of Washington in 1939.[3] The 1940 and 1950 surveys by the National Society for the

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Prevention of Blindness included all age groups, whereas the 1939 survey in the state of Washington included only adults.

Data for 1951 through 1955 came from our private offices and cover the cases of all 283 blind patients seen during that five-year period. Our statistics are not numerically comparable to those found in the other three surveys. However, they are a composite, regional representation, including all age groups in the various economic strata.

Causes of Blindness

Blindness and its causes have been considered under a nationally prepared classification, the Standard Classification for Causes of Blindness. As such, there are seven main classifications of causes: infectious diseases, trauma, neoplasms, general diseases, prenatal origin, causes unknown to medical science or not determinable by the physician, and poisonings (table 1).

Infection.—Blindness as a result of infectious diseases has been markedly altered. In 1885, diseases of the eyes, diagnosed as ophthalmia neonatorum, caused more than 10% of all blindness. Foote,[4] of the New

TABLE 1.—*Percentage of Blindness in the Various Cause Classifications in Four Survey Periods, 1940, 1950, 1939, and 1951-1955*

	Data from National Society for Prevention of Blindness		Data from Washington State, Blind Assistance	Data from Our Private Offices
Causes	1940	1950	1939	1951-1955
Infectious diseases	21.2	14.1	10.7	7.4
Trauma	8.8	7.2	7.6	6.4
Neoplasms	0.7	0.9	0.4	1.1
General diseases	5.1	9.6	5.9	11.7
Prenatal origin	9.5	11.3	6.3	17.3
Unknown to science	34.3	41.2	42.4	49.8
Cataract	16.5	21.9	24.3	29.3
Glaucoma	12.0	12.8	11.4	8.8
Undetermined by physician	20.0	15.3	23.5	2.1
Not specified	...	...	3.0	...
Poisonings	0.4	0.4	0.2	4.2

York State Committee for the Prevention of Blindness, states that, about 1906, 28% of all children admitted to schools for the blind in New York state had their cause of blindness diagnosed as ophthalmia neonatorum. Because of varied reasons, some of the statistics around 1900 and even up to the present time are not as differentiated as might be desired. Due to changes in the classification of the causes of blindness, it is not always possible to accurately compare statistical data of various early years. Moreover, it is not correct to assume that the diagnosis of 1885 or 1906 of ophthalmia neonatorum meant a gonococcic conjunctivitis. Several types of conjunctivitis resemble each other and could lead to blindness.

The fact remains that many children were blind as a result of an eye infection and that a large number of such infections could be assumed to be gonococcic in origin. Yet improvements in diagnosis, preventive treatment, or treatment after infection had begun were so successful that by 1930-1931 [4A] reports from all schools in New York state reporting their residence population showed that among 908 new entering pupils only 7.5% were blind because of ophthalmia neonatorum. Contrast that percentage with the survey published by Kerby [4A] in New York state in 1951 in which it was determined that only 1% of blindness in children was due to acute infectious conjunctivitis (ophthalmia neonatorum).

About 1935, authors such as Berens and co-workers [5] found that infectious diseases of all sorts, such as measles, syphilis, and trachoma, had caused about 28% of blindness in school-age children. Yet, in 1950, only 9% of children in schools for the blind were blind as a result of some type of infectious disease.

Trachoma has caused 1% of Egypt's population to become blind.[6] The disease has frequently responded to some of the sulfonamides or the antibiotics. Oddly enough, different strains of the trachoma virus in different countries have apparently caused a discrepancy in response to these newer drugs. Syphilis, when it involved the cornea as an interstitial keratitis, formerly caused much blindness, but now, after the introduction of neoarsphenamine and later the antibiotics, involvement of the cornea by syphilis has become a negligible factor. Optic atrophy associated with syphilis undoubtedly caused most of the 10.7% of blindness due to infectious diseases in the Washington survey of 1939 (table 1). In the 1940 and 1950 surveys of the National Society for the Prevention of Blindness, syphilis as a cause of blindness declined from 7.9% to 5.8%. Our survey reveals syphilis to be the cause of only 1% of blindness.

It is evident that infection has lost its previous eminent position as the cause of blindness. This is largely due to the treatment with the new drugs and cure of the primary systemic diseases such as syphilis and meningitis. Effects from gonococcic infections have been greatly subdued because of prenatal treatment of the mother, which has thus reduced infection within the birth canal, and the successful antibiotic treatment of any conjunctivitis seen after birth, which has thus made it possible to cure gonococcic conjunctivitis or other infections of the conjunctiva and cornea. Endogenous uveitis has been a condition to dread, for it has frequently resisted every considerable form of treatment. In spite of the use of every new drug, uveitis caused 3% of blindness in our survey, although, admittedly, some of the patients undoubtedly were afflicted before the advent of the antibiotics. Blindness due to sympathetic ophthalmia, which used to be a major risk with every eye injury, is now a rarity largely through the use of corticosteroids.

Herpes simplex virus infection of the cornea demands caution in its treatment. Many times the use of corticosteroids has been dangerous and has caused an irreversible damage. Locally applied corticosteroids will reduce the inflammatory response, thus causing congestion and edema to subside. The eye looks better, at first. The patient is relieved of discomfort, but soon the corneal infiltration involves the deeper layers of the stroma. The superficial dendriform keratitis changes into a so-called deep, intractable, metaherpetic keratitis. The preferred treatment is that of a caustic chemical or a heated cautery applied directly to the herpetic corneal lesion.

When properly selected, one of the antibiotics may cure almost every superficial, bacterial eye infection, provided the treatment is started in time. It is not feasible to culture material from the conjunctival secretion or corneal debris in every infected eye

in order to isolate the offending organism and determine its sensitivity to antibiotics. The routine, everyday office practice causes such a procedure not to be practical except in exceptional, stubborn cases. Also, it has been noted that several strains of pathogenic bacteria, such as micrococcus (Staphylococcus) pyogenes var. aureus, which is the most common pathogen invader of the conjunctiva, have developed a resistance to one or more of the antibiotics, particularly penicillin.

Trauma.—Trauma causes a great deal of blindness, though, fortunately, it usually involves only one eye. Sympathetic ophthalmia used to be the major risk with every injury. Thanks to the corticosteroids, such a development can be checked. At this time, it is not amiss to repeat the timeworn warning, as good today as yesterday, that sharp-pointed pencils, knives, and scissors, glass, toys with sharp edges, and explosives should be kept from the hands of inquisitive children. Even though the eyes represent only 1/600th of the body surface, injuries to the eyes create a serious handicap. Eye injuries make up 3% of all industrial injuries.

National statistics published in 1947 [7] reveal that, of 20,000 persons who were blind and receiving assistance to the blind, 10% of them were blind because of injuries. The Washington state survey of 1939 revealed 7.6% of blindness caused by trauma; our survey showed 6.4%; and the National Society for the Prevention of Blindness surveys of 1940 and 1950 showed 8.8% and 7.2% respectively (table 1). Industrial safety lenses of heat-tempered glass, plastic lenses, and many other eye safeguards have effectively contributed to the prevention of eye injuries.

Neoplasms.—Growths which involve either the eyeball or some portion of the various optic parts by direct growth within the eye or by pressure because of growth near the eye always have and always will cause a certain amount of blindness. Though such neoplasms make up only 1% of the total causes of blindness (table 1), improvement in treatment is still in progress. Retinoblastoma is bilateral in more than 25% of those afflicted with it. Early recognition and x-ray treatment may save the child's sight as well as his life. Every baby who has a routine examination should have his eyes examined with an ophthalmoscope by the family doctor so that this condition, if it exists, can be discovered in its early stage.

In every case of esotropia (crossed eyes) or in every baby in whom there is a gray reflex behind the pupil, the disease should be considered. In rare cases, melanoma can develop in an eye, though the other eye had been lost from some other cause. Melanoma does not respond to x-ray, but, if the growth is small, sometimes it can be destroyed by radon seeds, which are attached to that portion of the sclera where the tumor is located. Two such cases in which the partner eye was blind for another reason have been successfully treated by one of us (A. de R.).

General Diseases.—In the fight against blindness an increased longer life expectancy is a handicap, inasmuch as more people then reach the age when arteriosclerosis, hypertension, nephritis, or diabetes have had time to damage the eye. No wonder this cause increased from 5.1% to 9.6% in the 10-year period between the 1940 and the 1950 surveys of the National Society for the Prevention of Blindness. In the survey from Washington state in 1939, this cause was 5.9%. In our survey it amounted to 11.7%, with half being the result of diabetes (table 1).

Curiously enough, diabetes presents an anomaly. This disease may exist for many years either under control or not under control, and the impairment within the eye may vary from none to complete blindness. It has always been difficult to correlate why conditions develop within the eye in spite of a well-controlled diabetic regimen. Hemorrhages, for which some alteration in the blood vessel wall may be responsible, may occur into the retina or between the retina and the vitreous. Because of the many irreversible damages which occasionally occur within the eye of a person with diabetes, the ophthalmologist always insists upon strict supervision by the attending physician. At least two-thirds of patients with poorly treated or poorly controlled diabetes develop retinal changes after 20 years of illness. Because only half as many develop changes if the diabetes is well controlled, there has never been the slightest question that the services of the attending physician must be constantly required to oversee the entire picture.

Prenatal Origin.—Some blindness may be hereditary, genotypic blindness, which, in turn, may be considered caused by a recessive or dominant trait. At times, blindness may occur as a result of intrauterine damage to the fetus, which started to be normal but was injured by diseases of the mother that she acquired while carrying the baby. Although it is possible to diagnose hereditary eye diseases, treatment as a means of prevention is difficult because of human nature and because the most dangerous diseases are those of the recessive trait group and we cannot determine which parent is the heterozygote, the carrier. Furthermore, hereditary pigmentary degeneration of the retina, which almost invariably causes economic blindness in persons 50 years of age or more, is sometimes not diagnosed until after children have been born; by this time any of the children may be carriers, and the number of those who transmit the condition may have increased.

Other recessive inherited traits which cause seriously debilitating eye conditions are albinism, congenital dislocation of the lens, heredodegeneration of the macula, and hereditary retrobulbar neuritis. The inherited dominant traits which may lead to blindness are aniridia, coloboma of choroid, and corneal degeneration. The type of inheritance of the most dangerous disease, retinoblastoma, is not always clear.

It must be emphasized that some congenital malformations are not genetically determined. As Ingalls [8] recently pointed out, some of them are manifestations on the fetus after critical stress, that is, after a physical or toxic-effect stress or stress from virus or x-ray effects, that the mother underwent during pregnancy. A classic example is the congenital cataract of a child, the offspring of a mother who suffered from rubella during the first three months of pregnancy. Hypoxia of the water in which a fertilized fish egg is growing may cause cyclopia, a fetal condition which occasionally occurs in a human baby.

Because of human nature, it is probable that there always will be some blindness due to hereditary disease. It has frequently been noted that proximity of

visually handicapped persons to one another causes compassion and eventual marriage. Indeed, it is not at all uncommon to find a man burdened with a high degree of myopia, which is one of the more common hereditary visual defects, marrying a girl who also has either a high degree of myopia or possibly one of the several other hereditary disorders.

Table 1 shows that 9.5% of blindness was ascribed to prenatal origin by the National Society for the Prevention of Blindness in its 1940 survey. In its 1950 survey the figure was 11.3%. The corresponding per cent in the Washington state survey of 1939 was 6.3. Our survey figure was 17.3%. These total percentages, applying to causes of blindness of prenatal origin, include causes of congenital malformations that are both genetically and not genetically determined.

Cause Unknown to Medical Science.—Many persons have become blind yet do not present themselves for examination to a competent authority until after an interval of several years. Sometimes the cause of such blindness may be ascertained easily; sometimes the origin or cause is obscured by the complications which have developed later, such as a shrunken eyeball.

In spite of the tremendous advancement in medicine, many persons are wandering in a hazy twilight, with their cause of blindness being "unknown to science." Within that group of unknown causes would be senile cataract, glaucoma, and senile degenerative changes of the choroid and retina. Persons with such conditions have what aptly may be called the senile degenerative changes.

Cataracts: Cataracts have often prevented good vision for many persons and have produced complete blindness in others. It is surprising that the 1940 survey by the National Society for the Prevention of Blindness showed 16.5% of blindness due to cataract, while the 1950 survey showed 21.9%. In the Washington state survey of 1939 the per cent of blindness due to senile cataract was 24.3. Our survey showed 29.3% (table 1). Many of these persons could have been operated upon and the cataract removed from both eyes.

It is needless to recount the advances of technique in ocular surgery within the past 25 years. No longer is a person with a cataract advised to wait until he reaches the state of almost blindness or "ripeness of the cataract" before it is removed. Today cataract surgery is advisable as soon as uncorrected vision in the better eye lessens to a degree that life becomes uncomfortable. Surgeons vary in their opinion as to the exact amount of vision which should be present, but the marked reduction of vision to 20/200 is no longer justifiable. Of course, some persons may have other conditions within the eye that render it inadvisable to operate for cataract. Certain persons have a fear of surgical procedure. It should be stressed that age in itself is not a contraindication for cataract surgery. Approximately 90% of all those operated on obtain 90% vision or better as a final result.

Glaucoma: In spite of all efforts, glaucoma exacts a heavy toll. The 1940 and 1950 surveys of the National Society for the Prevention of Blindness revealed 12% and 12.8%, respectively, of blindness due to this disorder. Our survey showed 8.8%. The Washington state 1939 survey showed 11.4% (table 1). This disease seldom starts before the person is 40 years of age; however, with the life expectancy nearing 70, more persons will fall victim to the disorder.

Glaucoma is usually termed an eye disease; actually it is the result of a group of peculiar causes, leading to increased intraocular pressure. Contrary to most diseases which are accompanied by pain, the most deadly form of glaucoma is that which carries no pain and yet may terminate in the complete destruction of vision. The condition sometimes may be advanced, developing relentlessly before the patient is aware. This is true of chronic glaucoma, in which the eye is robbed progressively of a portion of the visual field. On the contrary, acute glaucoma lends itself readily to treatment. Pain as well as redness of the eyeball are among its chief features. The patient thus seeks advice.

Early discovery is the best way to prevent blindness from glaucoma, estimated to claim at least 4,000 persons yearly.[9] Surveys [10] of many persons living in Philadelphia; Wright-Patterson Air Force Base, Dayton, Ohio; Cleveland; and Portland, Ore., have shown that about 2% of the population more than 40 years of age have some form of glaucoma. This is too many. Dr. Conrad Berens has been one of the early, persistent advocates for the use of a tonometer on every person over 40 years of age who has a routine physical checkup. A Schiøtz tonometer measures the pressure within the eye. The procedure is somewhat akin to the test done during a general physical checkup when a measurement of blood pressure is obtained. If tension has been increased, the earlier it is controlled by the use of miotics the less possibility that glaucoma may progress to the stage where surgery may be needed.

Medical therapy of glaucoma produced a notable forward stride recently upon the introduction by B. Becker [10A] of acetazolamide (Diamox), a carbonic anhydrase. In two-thirds of those patients with increased intraocular pressure, full control may be obtained, possibly for a year or longer. Acetazolamide does not cure glaucoma, it merely controls the intraocular pressure without or with simultaneous use of miotics for a temporary period of time.

Degenerative Changes: When statistics for the National Society for the Prevention of Blindness surveys of 1940 and 1950 were prepared, causes of blindness unknown to science included, to mention a few, glaucoma, senile cataract, and myopia. The Washington state survey of 1939 grouped causes unknown to science, undetermined by physician, and not specified into one large category. Review of that large category by one of us (P. D.), who was also a co-author of the Washington state survey,[3] reveals a better division. Those causes unknown to science should be 665 in number, or 42.4%; those undetermined by physician should be 269, or 23.5%; and those not specified should be 49, or 3.0% (table 1). Certain of these causes develop in childhood, such as the refractive error of myopia. Some are the degenerative changes occurring as an accompaniment of age. Macular degeneration, idiopathic retinal detachment, and diffuse choroidal or retinal atrophy are such examples.

These changes are the senile changes of which we see many examples long before blindness arrives. For comparative purposes, this group has been isolated

and found to compose 5.7% and 5.5% in the 1940 and 1950 surveys, respectively, of the National Society for the Prevention of Blindness. Senile macular degeneration alone was responsible for 7.6% of blindness among our patients. Although senile macular degeneration, which is the likely aftermath of senile vascular change, cannot be prevented, psychological help may be given to those who have lost central vision by reassuring them that they will not lose their outside or peripheral vision, that vision which enables them to maneuver unaided around the streets or around the house. Retinal detachment has only a single treatment, surgery. Early diagnosis is essential, but immediate surgery is the only treatment of value.

Poisonings.—Cases of blindness from poisoning have had a spectacular increase in number and an equally dramatic decline. Until 1942, poisoning as a cause of blindness was less than 0.5%, with 0.4% noted in the 1940 as well as in the 1950 surveys of the National Society for the Prevention of Blindness and .2% noted in the Washington state survey of 1939 (table 1). Up to 1942 not a single child had been entered in schools for the blind as a result of poisoning.

In the years right after 1942, a number of premature babies were found to have developed a membrane directly behind the lens, a condition that usually resulted in total blindness. The cause was unknown, ascribed to almost 20 completely unrelated possibilities, such as unaccustomed light in the premature eye, vitamin deficiency, virus infection, and place of residence. About 1953, almost simultaneously and in widely separated areas of the world, it was discovered that high concentration of oxygen was harmful as much as it was helpful. Within the state of Washington, 137 children known to have retrolental fibroplasia, together with their birth dates, are listed in a table. In the same table are the total number of new births for that year, based upon residence within the state.

Throughout the nation, some 8,000 children are blind today as a result of the excess concentration of oxygen. Our survey reveals 11, or 4.2% (table 1), babies blind from retrolental fibroplasia. In a survey of 1948,[11] there were 7 cases, or 6.7%, of retrolental fibroplasia among 96 blind persons. Kerby,[12] of the National Society for the Prevention of Blindness, estimated that in the year 1950 retrolental fibroplasia was the cause of blindness in almost 50% of blind preschool-age children. Retrolental fibroplasia has accounted for almost all the tremendous increase in the blind school-population, with only an occasional cause from poisoning due to some other source.

Difficulties in Classification of Causes of Blindness

To consider the difficulties of those authorities who are continually working on the Standard Classification of Causes of Blindness, it has been amusing to note what has happened in the case of retrolental fibroplasia. In the first years of its existence, it was believed that retrolental fibroplasia was of prenatal origin and probably was a fibrous growth within the vitreous. As a result of much research, the new revised classification will state that retrolental fibroplasia is an inflammation of the choroid and retina and that its cause is poisoning by excessive oxygen.

It has been interesting to note the development of this disease, together with its rise and fall. When the premature infant receives oxygen in high concentration, the retinal vessels may contract or close; when air with a normal amount of oxygen has been used later, the same retinal vessels have dilated, this being followed by a formation of numerous capillaries in the peripheral retina. An unusual edema develops, and later the retina becomes detached or a membrane may be formed behind the lens. If such a retrolental membrane develops, the disease condition no longer is reversible. Thanks to frequent eye examinations and the ability to see certain pathological changes, it was possible to recommend certain drastic changes of oxygen treatment, once the clue was found. It is hoped that retrolental fibroplasia as a cause of blindness is a thing of the past.

Comment

In review of table 1, it is obvious that three groups of the causes of blindness contain a particularly large number of persons: cause unknown to science, that due to prenatal origin, and that associated with general diseases. In causes unknown to science are included

TABLE 2.—*Total Number of Births and Number of Children with Retrolental Fibroplasia in Various Years in the State of Washington*

Year of Birth	Children Known to Have Retrolental Fibroplasia	New Births in Washington State
1946	8	51,941
1947	7	58,280
1948	15	55,460
1949	16	56,433
1950	17	55,755
1951	10	57,994
1952	29	61,436
1953	22	61,511
1954	10	62,703
1955	3	62,290
	137	

cataract, primary glaucoma, and senile macular degeneration, diseases occurring with overwhelming frequency in persons in the later middle-age group and in the senile. The survey by us showed that 45.5% were blind from these causes, while Sorsby's [13] statistics from England in 1953 revealed 59.7% blind from these causes. Blindness due either to prenatal or hereditary origin accounted for 17.3% in our survey (table 1). More blindness from general diseases must be expected, because such disorders as diabetes, various vascular changes, and hypertension are companions of increased longer life expectancy.

While the new antibacterial drugs have drastically reduced the number of persons blind as a result of infection, at the same time indiscriminate use of the corticosteroids is decried because of the danger of herpetic corneal infections. Safety measures and constant vigilance are necessary to prevent blindness from trauma. Because of the increased longer life expectancy, senile degenerative changes are increasing.

Blindness takes the largest toll at the two ends of the lifespan. In the first years of life blindness is caused by heredity and damage done to the developing fetus, while towards the later years of life systemic diseases and degeneration of the aging eyes cause blindness. Retrolental fibroplasia as a cause of blind-

ness, a cause which must be paid for in many years of suffering and which will exact a heavy financial toll from a generation yet to come, had a spectacular rise and an equally dramatic decline, within 12 years, when its cause and prevention were discovered.

In order to reduce further the incidence of blindness several suggestions are made: greater interest in hereditary eye diseases, a warning to expectant mothers of the danger of stress, the careful administration of oxygen to the premature infant, and the judicious use of antibiotics. Money spent on research has been returned with profit. When research is directed toward preventing or ameliorating the degenerative changes which occur during later life years, a reward of comfort will be forthcoming.

Some general diseases have eye complications, and these too will be helped by additional research. Early detection of glaucoma is by far the best treatment, even though early detection means examining many persons carefully. Industry has realized the value of protecting the eyes against injuries and treating infections promptly.

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TRACHEOTOMY—INDICATIONS, ADVANTAGES, TECHNIQUES, COMPLICATIONS, AND RESULTS

ANALYSIS OF THREE HUNDRED TEN RECENT OPERATIONS

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• *Tracheotomy is now recognized as a singularly effective means for removing retained secretions, for improving ventilation, and for obtaining physiological advantages in many different disease states, in addition to bypassing mechanical obstruction of the airway. The indications for tracheotomy can be separated into two broad categories, mechanical and secretional ventilatory. The benefits of tracheotomy in bypassing an obstruction are realized to a much greater degree if the operation is performed before severe obstruction develops. The physiological improvements following tracheotomy are improvement of ventilatory efficiency and removal of secretions, as well as assistance to the patient with a reduced vital capacity, such as in spinal cord injury, poliomyelitis, encephalitis, severe burns, and after extensive thoracic or abdominal operations.*

Until recent years the chief indication for tracheotomy was to bypass a mechanical obstruction of the airway. During the past decade, there has been a considerable shift in emphasis on the indications for the operation, which now is recognized as a singularly effective means for removing retained secretions, for improving ventilation, and for obtaining other physiological advantages in many different disease states.[1] To determine if these changing concepts were reflected in our present management of all types of ventilatory deficiency, an analysis was made of 310 consecutive tracheotomies performed in 300 patients at Brooke Army Hospital during the period from January, 1947, to July, 1955.

The range in age of the patients was from newborn to 82 years. The three youngest patients were less than 36 hours old. Ten per cent of the patients were less than 7 years of age and 10% were over 60 years of age. The great majority were in the 20-to-45-year age range.

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In 1947, there were 9 tracheotomies performed; in 1948, 13; in 1949, 14; in 1950, 21; in 1951, 35; in 1952, 46; in 1953, 53; in 1954, 79; and in six months of 1955, 40. This gives a total of 310. Thus, there was a progres-

sive yearly increase in the number of operations performed, although the patient population of this institution showed no significant change during this time. This increase was due mainly to the use of tracheotomy for its recently recognized advantages rather than for the time-honored indication of circumventing mechanical blockage of the airway. Nearly all the classic as well as the newer indications were present in this group of patients. In addition, certain lesser publicized uses for tracheotomy—in burns, spinal cord injury, anesthesia, respiratory resuscitation, and thoracic surgery—were encountered.

Indications

The indications for tracheotomy were separated into two broad categories, mechanical and secretional ventilatory obstruction, because of certain clear-cut clinical differences in the two types. In the first group there were 148 operations performed on 140 patients to prevent or treat mechanical narrowing or obturation of the airway. Fifty per cent of the operations were performed prophylactically before clinical obstruction of the airway existed. In the second group there were 162 operations performed on 160 patients to prevent or correct secretional obstruction of the lower airway, to improve ventilation, and for other physiological advantages. Sixty per cent of these operations were performed prophylactically.

TABLE 1.—*Comparison of Use of Tracheotomy for Mechanical Ventilatory Obstruction (MVO) and Secretional Ventilatory Obstruction (SVO) in 310 Operations (1947-1955)*

Year	Indication			
	MVO		SVO	
	No.	%	No.	%
1947	9	100	0	0
1948	12	92	1	8
1949	13	93	1	7
1950	16	76	5	24
1951	17	48	18	52
1952	20	44	26	56
1953	22	42	31	58
1954	29	37	50	63
1955*	9	23	31	77
Total	162	48	148	52

* 6 months in 1955.

Comparison of the number of tracheotomies performed each year for each of these two groups demonstrates clearly the increased use of the operation for secretional obstruction, with 162 (52%) of the operations being performed for this reason (table 1). Before 1951 there were only scattered instances in which tracheotomy was employed for secretional obstruction. After that time this use became increasingly prevalent, until by 1955 it accounted for 77% of the tracheotomies in our group.

Analysis of the distribution of tracheotomy by primary disease site (table 2) revealed that 163 operations were associated with diseases of the head and neck and 147 were associated with lesions of the central nervous system and chest. Of the entire 310 operations, only 70 were related to involvement of the larynx or immediately adjacent tissues. This is in striking contrast to earlier reports by Figi [2] and Fitz-Hugh,[3] in which fully 95% of tracheotomies resulted from involvement of these structures.

It seems evident then, that mechanical airway obstruction no longer is the chief indication for tracheotomy and that the larynx and immediately adjacent tissues no longer are the major site of diseases requiring tracheotomy. The complete tabulation of specific diseases necessitating tracheotomy, classified by primary disease site and type of ventilatory deficiency, is shown in table 3.

TABLE 2.—*Primary Disease Site in 310 Tracheotomies*

Disease Location	Operations, No.	
Head and neck		163
Tumors	54	
Diseases and injury, trachea and larynx	46	
Burns	35	
Maxillofacial injury	28	
Neck injury	11	
Central nervous system		118
Cerebral disease	62	
Head injury	32	
After neurosurgery	24	
Thorax		29
Chest injury	16	
After thoracic surgery	13	
Total		310

Mechanical Ventilatory Obstruction.—Tracheotomy was performed to prevent or treat mechanical airway obstruction 148 times (table 3). This obstruction was of two types: (1) acute, sudden, or complete and (2) partial or chronic. Acute obstructions usually are recognized readily from obvious signs that the patient is breathing against resistance. Chronic obstruction, most often the result of tumors or laryngeal stenosis, may not produce external signs of dyspnea. However, due to long-standing hypoventilation, insidious hypoxia and hypercapnia may develop, causing the chemical respiratory equilibrium to shift, resulting in a compensated respiratory acidosis. Under these conditions, the margin of safety is quite narrow and only brief periods of additional respiratory obstruction may be rapidly fatal. It is important to recognize either type of mechanical airway obstruction so that acute obstructions can be energetically treated and chronic obstructions can be relieved before an acute crisis supervenes.

TABLE 3.—*Specific Causes for Mechanical and Secretional Ventilatory Obstruction in 310 Tracheotomies, Classified by Primary Disease Site*

Mechanical Obstruction (148)*	
Head and Neck	(148)*
Tumors†	(54)*
With laryngestomy	39
With neck dissection	7
Preradiation	8
Tumor obstruction	16
X-ray therapy obstruction	4
Trachea and larynx	(40)*
Inflammation	15
After instrumentation	15
External trauma	5
Vocal cord paralysis	4
Congenital obstruction	1
Burns	(26)*
Head and neck	21
Respiratory tract	5
Maxillofacial injury	(23)*
With fractures	16
Soft tissue injury	7
Neck injury	(5)*
Soft tissue injury	5

Secretional Obstruction (162)*	
Head and Neck	(15)*
Burns	(9)*
Head, neck, and body	8
Respiratory tract	1
Central nervous system	(118)*
Poliomyelitis	35
Encephalitis	7
Vascular accident	4
Fat embolism	3
Air embolism	1
Barbiturate poisoning	3
Tetanus	2
Miscellaneous (uremia, septicemia, cirrhosis, diabetes, porphyria)	7
Head injury	32
After neurosurgery	24
Thorax	(29)*
Chest injury	(16)*
"Wet" lung	8
Flail chest	8
Thoracic surgery	(13)*
Pulmonary	8
Esophageal	5

* Numbers in parentheses indicate total number in each category.
† Of the tumors of the head and neck, 30 were of the larynx, 15 were of the neck (metastatic), and 9 were miscellaneous.

There were 23 deaths in the hospital in the 140 patients, a fatality rate of 16%. Five deaths were due

partially or wholly to complications of tracheotomy and five were believed due to a delay in the prompt performance of tracheotomy.

Secretional Ventilatory Obstruction.—Tracheotomy was performed to relieve secretional ventilatory obstruction 162 times. The operation was done in certain instances to improve respiratory physiology or for use as a vent. The great majority of operations in this group, however, were performed to relieve fluid accumulation in the lower airway associated with dysfunction of the normal coughing process.

There were two clinical groups of patients having disturbances of the normal coughing process: (1) those who were unwilling to cough and (2) those who were unable to cough.[4] Pain on movement of the chest wall after operation or injury was the chief reason for unwillingness to cough. About 15% of the patients with secretional obstruction were in this group. Inability to cough resulted from anesthesia, coma, or debilitating diseases. In these patients, who made up 55% of the total group, the anatomic mechanism for coughing was intact but the central response to stimuli was depressed. Inability to cough resulted also from interruption of the neuromuscular pathways necessary for coughing. About 30% of all secretional obstruction was due to this cause.

The physiological abnormalities resulting from retained secretions consist of hypoxia, hypercapnia, and respiratory acidosis. The asphyxia that ensues, although more insidious, may be just as deadly as that of mechanical airway blockage. Several important concepts regarding the clinical state of asphyxia due to retained secretions should be noted. 1. The seriousness of oxygen deprivation, especially in the presence of central nervous system damage, is well documented.[5] 2. Carbon dioxide retention is of equal importance in causing serious changes. Hypercapnia may reach dangerous levels even with a normal oxygen saturation.[6] Relief of respiratory obstruction is the only sure method of combating hypercapnia. 3. Many vicious cycles of increasing asphyxia may result from hypoxia and hypercapnia, especially in the presence of cerebral or thoracic lesions.[1b] 4. The clinical manifestations of hypoxia and hypercapnia may be identical to those resulting from the primary disease.[7] 5. Obvious signs of respiratory distress and cyanosis may be neither common nor early signs of secretional obstruction. In fact, in many diseases with associated secretional obstruction, the patient's ability to manifest dyspnea is nullified by central respiratory depression or weakness of the thoracic bellows system.

There should be a high index of suspicion that retained secretions are associated with the lesions listed in table 3 under secretional ventilatory obstruction. Reliable findings consist of rales and rhonchi over the lung fields and physical or roentgenographic evidence of atelectasis or pulmonary infiltration. Frequently these signs may be minimal or absent, with the only changes being alteration of the vital signs and apprehension, uncooperativeness, restlessness, and irritability. The quantity of secretions obtained after tracheotomy even in the absence of signs of retained secretions was surprising in certain instances. The prompt improvement of the patient left no doubt that many of the grave findings were due to hypoxia and hypercapnia.

In many of the patients every conceivable method for removal of secretions was tried and found to be inadequate. In others the indication for early tracheotomy, as the initial step in management, was apparent. Tracheotomy often was the single best method that met all the existing requirements for a clear airway.

In the 160 patients, there were 91 deaths, giving a fatality rate of 57%. Of these deaths, only one was due to complications of tracheotomy, while in five patients errors of surgical judgment in the use of tracheotomy were partially responsible for death.

Advantages of Tracheotomy

The advantages of tracheotomy in bypassing an obstruction were dramatically illustrated in patients with head and neck tumors, burns, maxillofacial injuries, and trauma to the larynx. The benefits of tracheotomy were realized to a much greater degree if the operation was performed before severe obstruction developed. The removal of accumulated secretions in patients with cerebral diseases and injuries resulted in improvement and lowered mortality mainly because the danger of the devastating combination of damaged cerebral and medullary tissues plus low oxygen and high carbon dioxide concentrations was minimized.

The use of tracheotomy for improving ventilatory efficiency as well as removal of secretions are advantages recently stressed by Carter[8] in cases of chest injury. The decreased resistance to breathing and elimination of dead air space above the tracheotomy site are potent factors in promoting a more efficient utilization of the reduced tidal air exchange that occurs with crushing chest injury. These same physiological improvements are of advantage in any patient with a reduced vital capacity, such as in spinal cord injury, poliomyelitis, encephalitis, severe burns, and after extensive thoracic or abdominal operations.

An additional physiological advantage was noted in certain of these patients. The tracheotomy opening served as a vent (1) in respirator patients to prevent the action of the respirator from drawing pharyngeal secretions into the larynx[7]; (2) in patients with increased intracranial pressure to lessen the transmission of intrathoracic pressure to the cranial cavity[9]; and (3) to prevent pressure due to a closed glottis from forming on a precarious bronchial stump closure. This last use has not been described previously. We found it to be of practical merit in two patients after difficult pulmonary resections.

Special Uses for Tracheotomy

The tracheotomy opening was used as a simple and accessible route for endotracheal anesthesia 101 times, artificial respiration 25 times, and bronchoscopy 22 times. Bronchoscopy was employed in patients with secretional obstruction or crusting of secretions not relieved by the usual method of aspiration. Endotracheal anesthesia was administered through the tracheotomy opening in patients with deep burns of the face, maxillofacial injuries, head and neck tumors,

and head injuries. The anesthetic technique is simplified by this method, since the endotracheal tube can be placed after topical anesthesia and the surgical field remains free of anesthetic apparatus. Some patients underwent anesthesia in this manner as many as 15 times. About one-third of the patients with deep facial burns had tracheotomy performed primarily for use in anesthesia.

In patients with severe intracranial damage who developed sudden respiratory failure, respiratory exchange was restarted and maintained by attaching the tracheotomy to a source of oxygen with rubber tubing. This tube should have a side-vent that can be opened and closed with the finger so that inspiration and expiration can be simulated with the make-and-break flow of oxygen. Leakage of oxygen can be diminished by placing a gauze pack in the pharynx.

If more than emergency respiratory resuscitation is needed, then the tracheotomy cannula can be replaced with an endotracheal tube that is connected to one of several types of automatic respirators such as the pneophore or Jefferson ventilator. These devices have the disadvantage of causing extreme drying the respiratory mucosa and crusting of secretions. In addition, access to the airway is limited and, since the normal means of liberating carbon dioxide is prevented, respiratory acidosis may occur. Most of these disadvantages are avoided by using the extracorporeal or tank respirator for respiratory assistance. On the basis of our experience, nearly every respirator patient should have a tracheotomy.

Technique

The technical details of these 310 tracheotomies were as follows: The operation was elective in 200 cases, urgent in 62, and done as an emergency procedure in 48. The skin incision was vertical in 248 cases and transverse in 62. The tracheal incision was vertical in 224 cases, cruciate in 28, and T-shaped in 12; the excision technique was used in 46 cases. The type of anesthetic used was local in 248 cases and general in 34; no anesthetic was used in 28 instances. Emergency operations were those in which little time was allowed for anesthetization or sterilization. The emergency nature of these tracheotomies is demonstrated by the fact that no anesthetic agent was employed in over one-half. With elective operations, there was generally ample time to decide upon and perform tracheotomy. Certain operations fitted neither of these categories and were arbitrarily termed urgent.

Although many variations in technique were employed by the different surgeons, a decided preference was shown for the classic method, with use of a vertical skin incision and a simple vertical slit into the trachea. It is our opinion, based on anatomic, clinical, and experimental study, that in elective operations excision of a segment of the anterior tracheal wall should be accomplished and that, if the thyroid isthmus overlies the optimum site for the tracheal opening, it should be divided instead of being retracted. These additional steps provide a safe airway should the cannula be removed by accident or design, especially in the first three or four days after tracheotomy before a patent fistula forms. With the classic technique there is a distinct hazard that the thyroid isthmus will cover the tracheal opening or that the edges of a simple slit will approximate if the cannula should be dislodged or removed. Several serious episodes of respiratory distress occurred when the cannula was removed in certain patients with laryngeal obstruction. One death from sudden asphyxia resulted when a patient with severe edema of the larynx dislodged his cannula accidentally.

When the excision technique was used, the ease and safety with which the cannula could be removed and replaced with another cannula, a bronchoscope, or an endotracheal tube was impressive. No disadvantages, complications, or delay in healing resulted.

The most common mistake made in the performance of emergency tracheotomy was the loss of valuable time in an effort to gain visual exposure of the trachea. With use of the "feel" technique, as described originally by Jackson,[10] emergency operations can be completed in less than one or two minutes if the occasion demands.

TABLE 4.—*Complications and Deaths in 310 Tracheotomies*

Complication	No. of Complications	No. of Deaths
Blockage of cannula	10	1
Bleeding	10	...
During surgery	5	
After surgery	5	
Pneumothorax	7	1
Mediastinal emphysema	6	...
Difficulty with cannula	7	2
Too low	3	
Too short	2	
Too small	2	
Too long	1	
Technical difficulty	5	1
Apnea	3	1
Aspiration of vomitus	2	...
Wound infection	2	...
Persistent fistula	1	...
Esophageal injury	1	...
Total	54	6
Deaths due to errors of surgical judgment*		10
Total deaths due to tracheotomy		16

* Due to delay in performance of tracheotomy.

After-care and Complications

Since tracheotomy often is undertaken in haste and to save life, certain errors and complications might well be accepted as inevitable. However, our analysis of deaths and complications revealed that many of these mistakes were avoidable (table 4). In the more recent years of this study, the number of complications and deaths was reduced, despite an increased use of the operation. We attribute this reduction to several factors: (1) an increased awareness of the value of early tracheotomy before serious respiratory manifestations are present, (2) the performance of emergency tracheotomy with dispatch when indicated, (3) the use of an airway to convert urgent operations to deliberate ones, (4) the use of the excision technique for elective tracheotomy, and (5) careful attention to proper after-care.

The errors associated with tracheotomy occurred in three main categories: (1) those due to errors of surgical judgment, (2) those due to operative mistakes, and (3) those due to faulty after-care.

Ten deaths occurred, eight within the first five years of this study, because of delay in undertaking a clearly indicated tracheotomy. This fact further emphasizes the value of early tracheotomy. These deaths were tabulated without regard to the seriousness of the primary disease or other mitigating circumstances.

Complications and deaths occurring at the time of tracheotomy were more frequent in children and with emergency operations. The dangers of emergency operations in the young were lessened greatly if the surgeon was experienced in the performance of both emergency and elective operations and if a preoperative airway could be established to reduce the urgency of tracheotomy.

The majority of the other six deaths and 54 complications resulted mainly from faulty postoperative management rather than operative mistakes. The three basic steps necessary to keep both the natural and artificial airways open are (1) observe, clean, and change the cannula as often as needed; (2) humidify inspired air; and (3) aspirate tracheobronchial secretions properly. Violation of these principles was responsible in rare instances for loss of a life that had just been saved by a skillfully executed operation. The excision technique, with division of the thyroid isthmus where indicated, was responsible also for increased ease of all aspects of postoperative management. The continued safety of the airway was a potent factor in the prevention of serious respiratory embarrassment.

TABLE 5.—*Results in 300 Patients Undergoing Tracheotomy (310 Operations) for Mechanical Ventilatory Obstruction (MVO) and Secretional Ventilatory Obstruction (SVO)*

Patients, No.	Lived	Died	Saved by Tracheotomy
With MVO .....140(148)*	117	23[10]†	45
With SVO .....160(162)*	69	91[6]	37
Total .....300(310)	186	114[16]‡	82

* Numbers in parentheses indicate total operations.
† Numbers in brackets indicate deaths due to tracheotomy.
‡ 10 deaths due to delay in performance of tracheotomy.

Results

The results after tracheotomy are summarized in table 5. The over-all fatality rate in these patients was 38%, which indicates clearly the serious type of disease with which tracheotomy is associated. The number of deaths in patients with secretional obstruction was almost four times that of patients with mechanical airway blockage. This finding demonstrates that the diseases for which the value of tracheotomy has been recently recognized have an intrinsically high mortality. Inclusion in the mortality statistics of 10 deaths believed to be due to delay in performing tracheotomy introduces a factor that is difficult to evaluate—surgical judgment. In recent years, as the indications for tracheotomy have become well recognized even in fields of medicine and surgery where once there was little experience with the operation, this source of error has been virtually eliminated. In addition, increased familiarity with the operation has reduced the incidence of operative and postoperative mistakes.

The increased use of tracheotomy was reflected also by better survival rates in patients with cerebral and thoracic lesions. For example, of 40 patients in respirators who were treated with tracheotomy, about 50% more survived than in a group treated similarly, but without tracheotomy. In 16 patients with severe crushing injury to the chest, there was only one death. There were 82 patients in whom tracheotomy was considered lifesaving. This consideration alone, which disregards the special benefits, uses, and advantages of tracheotomy in reducing morbidity and increasing the ease of all aspects of the management of respiratory problems, seems ample justification for the present-day widespread employment of the operation.

Summary

An analysis of 310 recent tracheotomies points up the changing concepts regarding the indications and uses; the increase in scope and number of indications; the advantages and special uses of the operation; and the avoidance of complications and deaths associated with tracheotomy by better recognition of the need for the operation, by the use of certain refinements in technique, and by closer attention to the fundamentals of after-care of the patient who has undergone tracheotomy. It seems certain that this versatile operation, which is a safe and efficient means for saving life, reducing morbidity, and simplifying many problems of management in a wide range of common disease and injuries, will be even more widely used in the future, as the clinical advantages and safeguards of technique and after-care are better recognized.

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CLINICAL OBSERVATIONS IN MANIC-DEPRESSIVE DISEASE

A QUANTITATIVE STUDY OF ONE HUNDRED MANIC-DEPRESSIVE PATIENTS AND FIFTY MEDICALLY SICK CONTROLS

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• *From 249 psychiatric patients with the diagnosis of manic-depressive disease a consecutive group of 100 were selected by systematic criteria. They were compared with a control group of 50 patients hospitalized with diagnoses of recognized medical diseases. Data were obtained by clinical examination, laboratory tests, and questionnaire. The mean age of onset for men was 41.2 years and for women 41.4 years, and no evidence was found to justify the continued use of the phrase "involutional melancholia" as implying that there is anything distinctive about the depressions of women near the menopause. The frequency of each individual symptom was studied. Many "medical" symptoms, such as headache and abdominal pain, were as frequent in the manic-depressive group as in the medically sick controls. The most significant differences related to poor concentration, poor sleep, and low mood, which were more frequent in the manic-depressive group. Fear of "losing mind" occurred as a feature of manic-depressive disease. Spells of various kinds were common in these patients, and the "anxiety attacks" that occurred in about one-third of them were extremely rare in patients with medical disease. The patient's own impression as to the precipitating event was usually clearly wrong or improbable. Increase in alcoholic ingestion was common in the manic-depressive patient. Family history showed significantly more "alcoholic" fathers. At least part of the problem called "alcoholism" seems related to manic-depressive disease. Some symptoms, such as thoughts of suicide and poor concentration are rare in medical patients and characteristic of the manic-depressive patient. The consequences of this illness include alcoholism, losing jobs, marital infidelity, unhappy marriages, business failures, lawsuits, and automobile accidents, among others. These serious consequences, the worst of which is death by suicide, make it important for doctors to learn to diagnose this common disease accurately. This can be done by the simple clinical pointers presented here. Knowledge of these facts is essential for the diagnosis and treatment of manic-depressive disease, one of the commonest of psychiatric disorders.*

Manic-depressive disease, in some of its aspects at least, has been recognized for a long time, as evidenced by descriptions of Hippocrates, Arateus, Job, and Burton,[1] among others. Clinical studies, with published data, include those of Kraepelin, Lange, Muncie, and Campbell.[2] Despite the fact that the disease has plagued the human race for a long, long time and that it is common in medical practice (over 12% of all cases in a large diagnostic hospital and clinic [3]) and is a serious cause of disability and even death,[2a] it is still true that the cause of the illness is not clear, that its diagnosis is inexact and frequently missed, that the mechanism of the symptoms is not known, and that the treatment is still uncertain and a matter of debate. Because of the seriousness of the problem of manic-depressive disease and the many gaps in knowledge about it, further study is necessary. Before studying further the details of the disease, it seemed important, as in previous studies of common psychiatric disorders—anxiety neurosis,[4] hysteria,[5] and compensation neurosis [6]—to begin with a detailed clinical study not only for practical diagnostic purposes but for further use as a clinical base line in other scientific studies. This report deals with clinical observations in 100 manic-depressive patients as compared with 50 medically ill patients of comparable age and background. It is hoped that the results of this study will serve as a clinical base line for further scientific studies of manic-depressive disease by our group as well as by others.

Methods of Selection and Study

Selection of Patients.—One hundred patients were hospitalized and selected systematically by special criteria for this study. They were part of a group of 340 psychiatric patients the conditions of 248 of whom were diagnosed as being manic-depressive disease, while 29 were given no diagnosis. Sixty-two were given other psychiatric diagnoses, and 1 had no disease. The 100 patients were considered sick enough to require hospital observations, and in most cases the patients were admitted for electroconvulsive treatment. In general they were probably the sickest of the whole group of 248 patients with manic-depressive disease. The remaining 148 were treated with sedatives and office guidance. Admission to the series was by one of the following criteria from the information on a form (fig. 1): I. By the systematic method, the patient (*a*) had made at least one statement of mood change, including any of the following: blue, worried, discouraged, and 16 equivalent expressions and (*b*) had any 6 of the 10 of following special symptoms: slow thinking, poor appetite, constipation, insomnia, feels tired, loss of concentration, suicidal ideas, weight loss, decreased sex interest, and wringing hands, pacing, overtalkativeness, or press of complaints. II. In the examiner's best opinion manic-depressive disease was the

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correct diagnosis, based on all clinical information and judgment. III. The patient's condition was undiagnosed, and manic-depressive disease could not be excluded.

In the absence of other diagnosed medical, neurological, or psychiatric disease, a patient could be admitted to the series by any one of the above three criteria. Of these, 83 were selected primarily on the basis of the systematic method (I), 17 were admitted on "examiner's best diagnosis" criterion (II), and none on the basis of criterion III, i. e., undiagnosed. No patient was dropped from the study once admitted. The selector estimated whether the cases would be called typical by most psychiatrists and concluded (at best, this is an impression) that 81% of the cases were diagnostically clear enough so that most psychiatrists would agree and that, in the other 19%, other psychiatrists might question the diagnosis.

Name John Doe Address 100 Main St. Date 10/55 #10

This patient is admitted to this series because of (I) II III (Circle) and the symptoms in this patient are found in the absence of other diagnosed medical, neurological or psychiatric disease that might explain the symptoms.

(I.) a) Mood change including any of the following:

Blue	(Low)	Afraid	Happy
Worried	High	Gloomy	"Never better"
Discouraged	Scared	Hopeless	"Tops"
Depressed	Fearful	Despondent	Empty
Anxious	Angry	"Don't care"	Disgusted

b) Had six of the following ten symptoms:

(1. Thinking slow)
(2. Poor appetite)
3. Constipation
(4. Insomnia)
(5. Feels tired)
(6. Loss of concentration)
(7. Suicidal ideas)
8. Weight loss
9. Decreased sex interest
10. Wringing hands, pacing, over-talkativeness, press of complaints

(II.) Patients in whom the diagnosis of manic depressive disease, in the examiner's opinion, was the best clinical diagnosis. Circle A – B.

(A Patients in whom general agreement on the diagnosis would be anticipated.)

B "Atypical case" – Patient in whom general diagnostic agreement would not be anticipated.

III. Undiagnosed cases – Cases in which examiner believes manic depressive disease cannot be excluded but diagnosis uncertain.

Diagnosis: Manic-Depressive Disease

Fig. 1.—Form used for selection of patients in study on manic-depressive disease.

Selection of Control Subjects.—For purpose of comparing symptoms, past history, general features of temperament, and some social consequences of illness, 50 control subjects were selected. These were chosen in approximately the same age group and with approximately the same proportion of men and women as in the group of manic-depressive patients. Medically sick hospital patients in the same hospital were selected in order to learn how other sick patients compared with manic-depressive patients. These patients were consecutive admissions of five physicians and also some ward patients. The patients were predominantly private patients, in the manic-depressive group the proportion being 96 private to 4 ward patients; in the medically sick patients the proportion was 35 private to 15 ward patients. All control patients had been given definite diagnoses. No undiagnosed cases or cases of primary neurological or psychiatric diseases were included. The diagnoses included heart disease in 16, neoplasm in 11, liver disease in 6, kidney disease in 7, diabetes in 3, peptic ulcer in 3, lung disease in 4, hernia in 2, cholecystitis in 1, and thyroid disease in 3; 6 had two diseases. Three were excluded from the study because, at the time of examination, the patients were too sick with dyspnea or coughing to take part in the interview. One subject who was included was incompletely interviewed because she refused to go on with the interview.

Methods of Study.—To all 100 patients in the group of manic-depressive patients and to the 50 medically sick patients, in addition to the usual clinical examination and laboratory tests, a questionnaire containing 188 items was administered. This questionnaire (the details of which are in appendixes 1 and 2, which are not included in this published report) followed in a systematic way the general outline of the usual medical and neuropsychiatric history. There were the following number of items in each category: general and identifying, 9; chief complaints, 1; symptoms of present illness, 65; history, 65; course and associated events, 8; operations and hospitalizations, 4; other illnesses, 12; and examination items, 20. The studies also included routine neuropsychiatric history and examination, electrocardiogram, roentgenograms of the chest, hematological and urine examination, and, in selected patients, special tests, such as electroencephalographic studies, endocrine studies, and others. The questionnaire was administered and examination of both patients and controls was done by the same physician, using, as far as possible, the same wording of questions (appendix 2). The selection of patients and controls was done by another physician. Data were recorded on prepared forms and were tabulated, and results were analyzed statistically. Comparisons of means, modes, and proportions and calculations of standard errors of means and proportions and of significance ratios were made by means of standard statistical calculations.[4b]

Results

Evaluation of Methods of Selection.—Eighty-three of 100 manic-depressive patients were selected on the basis of both methods I and II. In the other 17 patients, the criteria of method I were not completely met, and they were included by method II. Of these 17, 10 had as many as four or five of the required six symptoms. Four of the 17 patients who did not meet the criteria were predominantly manic. Since there were only six predominantly manic patients in the entire study, it appeared that the systematic criteria were not well suited for predominantly manic patients. One patient was mute at the time of selection observations, and one dissimulated at the time by denying any and all symptoms. The data suggest that, in general, diagnoses based on method I agreed fairly well

with those based on method II. Since the systematic criteria were based on our ideas of best clinical methods for diagnosing manic-depressive disease, the close agreement was obviously not pure chance. A follow-up study, in which information was obtained from 97 of the 100 manic-depressive patients 11 to 36 months later (mean 16.6 months), showed that (1) in no case had another diagnosis emerged to explain the patient's symptoms or illness, and (2) three of the patients were again in the hospital, 72.2% were well or greatly improved, and 20.0% were moderately improved. These data, which were not intended as an evaluation of therapy, are presented to show that in these patients the disease had run the course generally described as the expected one of manic-depressive disease.[3]

Comparison of General Features of Manic-Depressive Patients and Controls.—Table 1 shows that the general characteristics, such as age, sex distribution, and ethnic and educational background, shown in

TABLE 1.—*General Characteristics of 100 Manic-Depressive Patients and 50 Medically Sick Controls*

	Manic-Depressive Patients	Medically Sick Controls
Mean age, yr.	48.2	53.6
Age range, yr.	23-79	21-79
Marital status		
Married, %	58	58
Widowed, %	11	14
Divorced, %	3	11
Single, %	28	24
Women, % of group	66	58
Women who are housewives, %	62	68
Education		
Less than high school, %	38	46
High school graduate, %	15	16
High school graduate and less than college graduate, %	21	14
College or more, %	16	8
Unknown, %	10	16
Ethnic group		
Irish or mixed Irish, %	66	74
Others, %	34	22
Unknown, %	0	4

studies on the groups of manic-depressive and medically sick control patients, were quite similar.

Administration of Questionnaire.—It was possible to score most of the answers to the questionnaire. Some patients and some controls did not answer an occasional question or answered in a way that could not be scored.

Age at Onset.—Age at onset of the disease, but not necessarily the present attack, ranged from 15 to 78 years, with a mean of 41.4, a mode of 31-40, and a median of 40.5 years. Distribution of the ages at onset by decade is presented in figure 2. The mean age at onset for those patients who were having their first attack was 48.1, with range of age at onset from 23 to 71 years. The mean age at onset for 34 men was 41.2 years and for 65 women, 41.4 years, which is in contrast to two other common psychiatric illnesses which begin earlier (fig. 3).

Chief Complaints.—The chief complaints seemed to divide into several categories, which included: (1) localized medical; (2) generalized medical; (3) psychological; (4) mixed, i. e., medical and psychological; (5) medical, general and local; and (6) no clear information. These complaints in 100 manic-depressive patients, quoted for the most part in the patients' own words, are

(1) localized medical in 18 patients: "head is heavy . . . feels sensitive"; "my neck . . . pressure in my throat"; "bowels . . . they won't move"; "headaches" (three patients); "sinuses"; "urinating frequently"; "pain in head like a balloon that burst"; "awful feeling . . . spasm in vagina"; "these sweaty hands"; "upset stomach"; "awful sick feeling in stomach"; feels she is pregnant; "I can't see"; "noise in ears like steam"; "I have a burning across abdomen"; "my heart pounds fast."

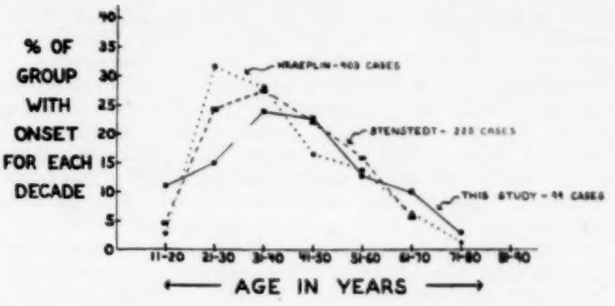

Fig. 2.—Graph of age at onset in 99 patients in this study, compared with data from Kraepelin in Germany, 1921,[2a] and Stenstedt in Sweden, 1952,[7] showing good agreement between studies done in different countries, at different times, and by different investigators.

(2) generalized medical in 11 patients: "tired"; "I'm exhausted"; "I feel all in"; "tired easy"; "jumping mostly at night"; "I can't do my work, I don't feel strong"; "sick feeling all over me"; "high blood pressure, they tell me"; "the tremors like a quivering"; "I tremble like a leaf"; "I have no energy."

(3) psychological in 58 patients: depressed (12 patients); "one section of brain working"; "seem to be afraid"; "I have nothing to look forward to, no interest" (two patients); "afraid to be alone" "afraid to go out alone at night"; "no patience"; "nervous" (four patients); "chronic nervousness"; "I find specks in my food . . . I've been morbid and won't eat"; "I could feel more relaxed"; "fear of having children"; "no interest" (two patients); "can't remember anything" (two patients); "lack of

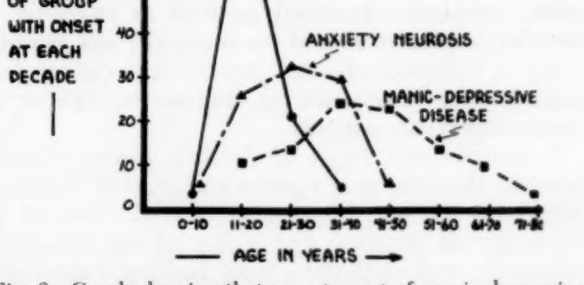

Fig. 3.—Graph showing that age at onset of manic-depressive disease may be much later than that of hysteria or anxiety neurosis (neurocirculatory asthenia).

sleep" (three patients); "I can't keep my mind on one thing long enough to finish it"; "just discouraged and hurt"; "black moods and blind rages"; "I'm doing such stupid things"; "silly fears"; "spells where it's hard to know what to think"; "I'm all mixed up"; "I have been very quick"; "undecided uneasy feelings"; "I couldn't concentrate"; "they had the police after me"; "very unhappy at times"; "afraid to spend money"; "holy spirit seems to tell me something"; "feelings of guilt"; "brooded around the house"; "I'm upset"; "doubtful about my vocation"; "worrying about things"; "I don't like to come home"; "I just

feel bad about the way things have worked out"; "I wonder if my marriage was a mistake"; "just all gone"; "my wife developed a system of symbols."

(4) medical and psychological in two patients: "I get scared to death and can't breathe"; "stiff neck and crying spells."

(5) Medical, general and local, in two patients: "breathing difficulty . . . pain all over"; "I have no power, my arms are weak, I can't work."

(6) no information in nine patients.

The chief complaints in 50 medically sick controls were

(1) Localized medical in 43 patients: "ankle swelling . . . fluid in legs"; "pain in chest and shoulders"; "pain in left shoulder"; "diabetes . . . my feet started swelling"; "swelling in left side of neck"; "pain in back"; "sort of congested . . . choked up"; "pain in left side of breast"; "pain in tip of spine"; "persistent headaches"; "pain in chest, like pleurisy"; "bleeding ulcers"; "ulcer"; "slight pain across chest"; "rapid heart"; history of bleeding with bloody stools; "backache"; vision down in left eye, frontal ache; "steady pain—right side"; "hard time breathing"; "pain in chest and down left arm"; drainage from right breast; "food don't seem to go through"; "wheezy"; "noticed a lump"; "cough"; "hernia"; "swelling in throat; "red blood in stool"; "constipation"; "pain in neck . . . constipated"; "headaches and losing weight"; "short of breath"; "asthma"; "bowel obstruction"; "headaches"; "nausea"; "always awfully bloated."

(2) generalized medical in three patients: "weakness and dizziness"; "weakness . . . could hardly get up stairs"; "just weak."

(4) Medical and psychological in four patients: "pain in back and no ambition"; "kind of dizzy and muddled up inside"; "somewhat nervous, lost a lot of weight."

(6) no information in 1 patient.

TABLE 2.—*Characteristics of Chief Complaint in 100 Patients with Manic-Depressive Disease and 50 Medically Sick Controls*

	Manic-Depressive Patients, %	Medically Sick Controls, %
Medical, localized	18	86
Medical, generalized	11	6
Medical, localized and generalized	2	0
Psychological	58	0
Medical and psychological	2	6
No information	9	2

Table 2 gives the relative proportions of the various types of chief complaints in the groups of manic-depressive and medically sick patients. It shows clearly that only 18% of the manic-depressive patients had chief complaints localized medical in character, in contrast to almost 90% of the medically sick controls. None of the medically sick patients had only psychological chief complaints, in contrast to 58% of the manic-depressive patients.

Symptoms and Signs of Present Illness.—Table 3 presents the data on symptoms and signs of the manic-depressive patients as compared with those of the medically ill patients. For a few of the symptoms, previously collected data from healthy control subjects (table 4) are included as a reminder of the relative infrequency of medical symptoms in healthy individuals.

Table 3 shows that "medical" symptoms such as headache, blurred vision, dyspnea, palpitation, anorexia, weight loss, nausea, abdominal pain, constipation, urinary frequency, dysmenorrhea, pains, and weakness among others occur in high frequency in manic-depressive disease. It is of note that these symptoms occur about as frequently in these patients as in medically ill patients, and some of the medical symptoms occur even more frequently in the manic-depressive group than in patients admitted to a hospital for medical illness.

TABLE 3.—*Symptoms and Special Signs of Present Illness in 100 Patients with Manic-Depressive Disease and 50 Medically Sick Controls*

Symptoms	Manic-Depressive Patients, %	Medically Sick Controls, %	Significance Ratio
Headaches	49	36	1.5
Blurred vision	32	16	2.1
Tinnitus	28	10	2.5
Diminished hearing	20	22	0.8
Burning throat	3	4	0.3
Burning tongue	7	0	1.9
Dyspnea	77	66	1.4
Palpitation	57	67	1.3
Chest pain	36	50	1.7
Anorexia	88	42	6.0
Increased appetite	3	6	0.9
Nausea	48	42	0.7
Vomiting	22	30	1.1
Indigestion	36	40	0.5
Abdominal pain	38	38	0
Weight loss	73	48	3.0
Weight gain	8	2	1.5
Constipation	60	52	0.9
Diarrhea	34	22	1.5
Urinary frequency	60	34	3.0
Dysmenorrhea	39	25	0.7
Menstrual lapses	22	25	0.2
Irregular menses	43	27	0.2
Excessive menses	25	12	0.7
Scanty periods	25	37	0.7
Hot flashes	29	14	1.6
Sex function increased	8	0	1.4
Sex function decreased	63	39	2.0
Paresthesias	53	34	2.2
Back pain	39	40	0.1
Joint pain	30	22	1.0
Extremity pain	25	26	0.2
Anxiety attacks	33	4	4.0
"Spells"	62	32	3.5
Dizzy spells	29	10	2.6
Weakness	54	46	0.9
Sleep change	97	50	7.0
Insomnia	94	38	7.5
Trouble getting to sleep	72	36	4.2
Early morning waking	80	16	7.5
Poor quality sleep	56	8	5.6
"Never sleep"	20	2	3.0
Sleeps too much	9	4	1.1
High and good mood	6	78	9.1
Low mood	95	16	9.7
Crying	72	32	4.7
Irritability	75	36	4.6
Temper increased	34	4	3.8
Temper decreased	21	2	2.9
Suicidal thoughts	45	2	5.3
Fear of death	35	18	2.0
Fear of fainting	23	8	2.2
Fear of losing mind	63	4	6.8
Think will get well	28	61	3.6
No possibility of recovery	20	6	2.1
Poor concentration	83	4	9.2
Thinks less clearly	58	2	6.4
Thinks more clearly	3	0	0.4
Speed of thinking increased	6	0	1.8
Speed of thinking decreased	64	6	6.7
Feels memory is poor	52	6	5.5
Hallucinations	7	0	1.9
Delusions	29	0	4.2
Signs			
Untidy	13	2	2.2
Untidy fingernails	29	4	3.4
Hair unkempt	32	11	2.8
Unshaved	24	5	5.8
Immobile facies	43	6	4.6
Crying	13	4	1.8
Tremor of outstretched fingers	21	11	1.4

The picture is somewhat different as concerns symptoms of psychological abnormalities (table 3), questions regarding which are unfortunately omitted in

the usual medical examination. Here there are a number of symptoms, such as poor concentration, slow thinking, low mood, "anxiety attacks," the feeling of having a poor memory, fear of losing mind, suicidal thoughts, and expression of low expectancy of recovery from the illness, that seem to be characteristic of manic-depressive disease and occur infrequently in medical disease.

TABLE 4.—*Frequency of Symptoms of Present Illness 100 Manic-Depressive Patients, 50 Medically Sick Controls, and 246 Healthy Controls**

Symptoms	Manic-Depressive Patients, %	Medically Sick Controls, %	Healthy Controls, %
Headaches	49	36	25
Blurred vision	32	16	7
Dyspnea	77	66	3
Palpitation	57	67	10
Chest pain	36	50	8
Anorexia	88	42	8
Nausea	48	42	7
Vomiting	22	30	5
Abdominal pain	38	38	16
Diarrhea	34	22	2
Urinary frequency	60	34	4
Dysmenorrhea	39	25	30
Menstrual lapses	22	25	2
Irregular menses	43	27	12
Excessive menses	25	12	2
Paresthesias	53	34	5
Back pain	39	40	16
Joint pain	30	22	5
Extremity pain	25	26	5
Anxiety attacks	33	4	5
Dizzy spells	29	10	14
Weakness	54	46	3
Insomnia	94	38	10
Crying	72	32	30
Irritability	75	36	15
Fear of death	35	18	3

* Mean age of manic-depressive patients was 48.2; of medically sick controls, 53.6; and of healthy controls, 39.0 yr. Healthy controls include 79 soldiers, 50 working women, 41 puerperal women from Boston Lying-in Hospital, 15 men employees of a utility company, and 50 men and 11 women from a large industrial plant.

In addition to symptoms notable for their frequency, some symptoms, such as insomnia, with early morning waking, and "anxiety attacks," with fears of losing mind, suggest manic-depressive disease. A few special signs that appear in significantly high proportions include such items as general untidiness, unkept hair, untidy fingernails and immobile facies. "Spells" of various kinds are common in manic-depressive disease (table 5). The "anxiety attack" is not seen as a feature of medical disease. In manic-depressive disease most patients show diminution of various functions (table 3) but a few show increases.

TABLE 5.—*Types of "Spells" in 62 of 100 Manic-Depressive Patients and in 16 of 50 Medically Sick Controls**

Types of Spells	Manic-Depressive Patients, %	Medically Sick Controls, %	Significance Ratio
"Anxiety attacks"†	33	4	3.9
"Dizzy spells"‡	29	10	2.6
"Confused spells"§	7	0	1.9
Undetermined spells	3	8	0.3
Syncope‖	2	12	1.0

* Data suggest that "anxiety attacks" occur frequently in manic-depressive patients and are extremely rare in patients with medical disease.

† "Anxiety attacks": spells with fear, apprehensiveness, and/or symptoms such as breathlessness, palpitation, tremors, and sweating.

‡ "Dizzy spells": spells in which "dizziness" is the chief feature or an important feature in the spell, without apprehensiveness or combinations, such as breathlessness and palpitation, which usually accompany apprehensiveness or spells in which sensation of abnormal balance appears.

§ "Confused spells": spells in which patient wanders about, is perplexed by, or feels there is change in self or environment.

‖ Syncope: fainting or faintness alone.

History.—Table 6 shows that history, with respect to medical symptoms, is about the same in patients with manic-depressive disease as in the medically sick controls. However, the history in manic-depressive patients reveals more symptoms such as insomnia; feelings of weakness; fears, particularly fear of losing mind; and suicidal thoughts. An average level of energy was characteristic in the history of medically sick controls, whereas manic-depressive patients show more of the extremes of energy levels. Whether these few differences constitute background symptoms in the manic-depressive patients or simply reflect the fact that some of the patients may have been ill before the present illness cannot be concluded from the data in the present study.

TABLE 6.—*Symptoms and Traits from History in 100 Manic-Depressive Patients and 50 Medically Sick Patients*

Symptoms	Manic-Depressive Patients, %	Medically Sick Controls, %	Significance Ratio
Headache	33	20	1.7
Blurred vision	7	4	0.7
Double vision	2	2	0
Tinnitus	9	4	1.1
Hearing	7	12	1.0
Breathing difficulty	24	32	1.0
Palpitation	22	16	0.8
Chest pain	15	14	0.2
Anorexia	24	16	1.1
Indigestion	26	22	0.5
Nausea	28	14	1.3
Vomiting	17	16	0.2
Constipation	40	28	1.4
Diarrhea	7	6	0.2
Abdominal pain	22	22	0
Urinary frequency	17	10	1.1
Lapses in Menses	21	14	0.9
Irregular menses	11	10	0
Excessive menses	20	21	0.1
Scant menses	5	7	0.5
Dysmenorrhea	39	24	1.4
Hot flashes	33	31	0.2
Mood changes with periods	52	34	1.6
Paresthesias	12	10	0.4
Paralysis	1	0	0.7
Back pain	23	10	1.9
Joint pain	19	14	0.8
Extremity pain	6	4	0.6
Sleep difficulty	46	16	2.9
Energy level, low	7	0	1.9
Energy level, average	26	47	2.6
Energy level, high	67	53	1.7
Spells	14	16	0.3
Crying	31	20	1.5
Irritability	13	8	0.9
Weakness	12	0	2.6
Fear of losing mind	20	2	2.9
Fear of death	10	8	0.4
Fear of fainting	9	0	1.9
Suicidal thoughts	14	4	1.9
Traits			
"Fussy"	78	60	2.2
Temper outbursts	37	33	0.4
"Funny" when well	60	54	0.7
Up-and-down disposition	28	8	2.9

The trait labeled as "fussy" (often termed "perfectionistic" or "compulsive"), that is, the patient believed himself to be overparticular, worried about details, or an overmeticulous housewife or businessman, was noted in 78% of manic-depressive patients. A high proportion of patients described themselves as having a reputation for being funny or witty, temper

outbursts in the past, or a markedly fluctuating disposition as far as mood was concerned, and a large proportion (43%) described themselves as having excessive energy, leading to extra jobs, extra activities, or extracurricular activities at school and gave evidence to prove it. However, when these proportions were compared to those of medically sick controls (table 6), it can be seen that in only one trait, that of varying from low to high moods, was there a clear-cut and impressive difference between manic-depressive patients and control subjects. There are inherently large subjective factors in both the subject and the examiner in this estimation.

The amount of previous surgery was about the same for the patients and the sick controls and did not deviate from that of healthy controls previously described.[8] The average number of operations for manic-depressive patients (66 women, with mean age of 48 years) was 1.71 operations per patient, as compared with 1.38 operations per patient for the medically sick controls (29 women, with mean age of 52 years). This difference is not statistically significant (significance ratio, 1.13) Operative rates per person and per 100 years were: manic-depressive, 3.63; medically sick controls, 3.10 (significance ratio, 0.84). Operative rates per person and per decade for manic-depressive vs. medically ill were as follows: 1-10 years of age, 0.23 vs. 0.24; 11-20, 0.11 vs. 0.24; 21-30, 0.36 vs. 0.26; 31-40, 0.57 vs. 0.17; 41-50, 0.50 vs. 0.36; 51-60, 0.80 vs. 0.34. Thirteen per cent of the manic-depressive patients had never had an operation in contrast to 28% of the controls (significance ratio, 1.6). Eleven per cent of the manic-depressive patients and 7% of the controls had 4 or more operations. There was no evidence that excessive surgery was important in manic-depressive disease in contrast to hysteria.[8]

With respect to other illnesses, in the 100 manic-depressive patients, either by history or during examination for admission to this study, there was evidence of the following diseases: peptic ulcer in 1, heart disease in 2, thyroid disease in 3, arthritis in 8, asthma in 2, and skin disease in 9. No patients had ulcerative colitis. It can be seen from the above data that the history of patients with manic-depressive disease was not psychologically spectacular or medically unusual.

Clinical Pathology.—Laboratory examinations, which included routine x-ray of the chest, electrocardiogram, routine hematological studies, and urine tests, were all within normal limits. A special study of electrocardiograms, as compared with those of healthy controls selected from a large community survey,[9] was made in the manic-depressive group. Detailed analysis revealed no characteristic abnormalities of electrocardiograms in manic-depressive disease.

Previous Episodes and Course.—Of the 100 patients, 6 were predominantly manic and 94 were predominantly depressed or anxious. No systematic attempt to place them into further subgroups[2a] was made. Forty-three per cent of the patients had had previous episodes of the disease. More than half, therefore, were in their first episode. Of patients over 45 years of age, 33% gave no history of manic-depressive disease.

Sometimes the term "involutional melancholia" is used to suggest a different disease from that called "manic-depressive psychosis." It was of interest, therefore, in this group to compare the symptoms of all women 45 years of age or over and in their first attack with those of other women in the series, i. e., women who had had more than one attack or who were under 45. The group of women over 45 with no previous attack consisted of 20 women with a mean age of 55.6; the others were 46 women with a mean age of 44.3. There was no striking difference in frequency of symptoms in the two groups (table 7). It can be seen, thus, that, as far as frequency of symptoms and disease picture is concerned, there was no difference between those patients having two of the characteristics of so-called involutional melancholia and the rest of the women in the group.

Twelve per cent of the 100 patients had been sick for one month or less, 32% for six months or less, 22% for one year or less, 27% for five years or less, and 4% for over five years. In 3% duration could not be determined. Thus, about half of the patients had been sick less than six months and about two-thirds of the patients for less than a year.

Use of Alcohol.—Eight of the 100 manic-depressive patients would probably have been considered "chronic alcoholics" by most physicians. These patients drank excessively, and their drinking was a problem to themselves or their families and interfered with their work. Table 8 shows the results of inquiry about the prevalence of alcoholism in the mothers, sisters, fathers, and brothers of the manic-depressive patients. It shows that the male relatives (fathers and brothers), as well as brothers alone, of manic-depressive patients show a significantly higher amount of alcoholism than do the male relatives of control subjects, those both sick and healthy. As compared with medically sick controls, significance ratio was 2.33; with total controls it was 2.94. There was no difference in prevalence of alcoholism in female relatives (sisters plus mothers) of manic-depressive patients as compared with controls. Brothers alone are significantly higher in alcoholism (3.12) in the manic-depressive patients, but fathers are not (1.01).

It is of interest that 28% of patients with manic-depressive disease drank more alcohol when ill, while 31% decreased their drinking. This is in contrast to the medically ill patients, who did not increase their drinking, except for three cardiac patients who had been advised to have a little drink to "relax" their hearts. The spontaneous reaction in 22% of the medically sick was to cut down on alcoholic consumption, while 72% showed no change.

It was further noteworthy that in the 28% of the manic-depressive patients who increased their drinking during manic-depressive disease, 11% of their fathers and 18% of their brothers were alcoholics, as compared to the smaller proportion, 4% of brothers and 6% of fathers, of the relatives of those manic-depressive patients who did not increase their consumption of alcohol during manic-depressive disease. These data suggest a possible relationship between manic-depressive disease and some portion, at least, of the problem called "alcoholism."

TABLE 7.—*Frequency of Symptoms in Twenty Female Manic-Depressive Patients, Aged Forty-five or over, with No Previous Episodes, and in Forty-six Other Female Manic-Depressive Patients*

Symptoms	Female Manic-Depressive Patients, 45 or over, with No Previous Episodes, %*	Other Female Manic-Depressive Patients, %†
Headache	60	50
Blurred vision	20	37
Blindness	0	0
Double vision	0	2
Tinnitus	30	19
Hearing	35	18
Burning throat	0	4
Burning tongue	5	7
Burning rectum	5	9
Burning vulva	0	11
Any burning‡	10	13
Dyspnea§	65	88
Palpitation§	68	46
Chest pain	30	33
Anorexia	90	91
Nausea	60	54
Vomiting	25	28
Indigestion	40	39
Abdominal pain	35	41
Weight loss§	90	69
Weight gain	5	16
Constipation	70	57
Diarrhea§	20	37
Urinary frequency	45	59
Hot flashes	35	27
Libido increased	9	10
Libido decreased	54	52
Libido, no change	36	34
Libido increases and decreases	0	3
Paresthesias	55	56
Paralysis	0	2
Back pain	35	43
Joint pain	30	30
Extremity pain§	15	37
"Spells"	58	75
Weakness	65	52
Sleep	100	100
Crying	75	85
Spirits	100	100
Irritability	70	78
Energy	100	98
Temper increased§	21	41
Temper decreased	16	22
Temper, no change§	63	30
Drinking increased	15	27
Drinking decreased	45	16
Drinking changed	60	43
Drinking, no change	40	57
Suicidal thoughts	45	41
Fear of death§	20	44
Fear of fainting§	15	38
Fear of losing mind	70	65
Poor concentration	70	89
Clarity of thought increased	0	4
Clarity of thought decreased	55	55
Clarity of thought changed	55	60
Clarity of thought, no change	45	40
Retardation of thought	55	48
Speed of thinking increased	0	9
Speed of thinking decreased	60	61
Speed of thinking, no change	40	30
Distractibility	0	9
Flight of ideas	10	9
Memory	60	78
Hallucinations	10	11
Delusions	20	31

* Mean age, 55.6 yr.

† Mean age, 44.3 yr.

‡ Percentage of patients with burning of throat, tongue, rectum, or vulva.

§ Significance ratios of the difference between proportions for symptoms between two groups were, where differences seemed largest, dyspnea, 1.57; palpitation, 1.67; diarrhea, 1.36; weight loss, 1.82; extremity pain, 1.79; drinking decreased, 2.49; temper increased, 1.55; temper, no change, 2.45; fear of death, 1.88, and fear of fainting, 1.84.

Sex.—In this group there were 34 men and 66 women; the mean age of the men was 49, and the mean age of the women was 48. The symptoms of palpitation, nausea, spells, and crying were statistically more frequent in the women. Change in drinking and sex activity occurred statistically more frequently in men (table 9). Otherwise the frequency of symptoms was about the same in the two sexes.

Precipitating Events.—The patients were asked what they believed was the cause of their illness. Attempts were made to decide whether these "causes" or "precipitating events" were possible, plausible, or reasonable. In 50 of the 100 patients no particular "cause" or precipitating event was elicited. In the other 50, the patient mentioned some event that he believed might be related to the onset of the illness. Of these 50 patients, 28 had the symptoms of the illness antedating the chosen "cause." Of the 22 remaining patients, there were 4 patients to whom time relationships were not clear.

This left 18 patients in whom there were no obvious symptoms before the patient's chosen "cause." On examination of the "causes" related by nine of these patients, four were describing symptoms of the illness (feeling of "overwork," a false belief of "lack of business" in a thriving professional practice, false belief of pregnancy, and a mistaken idea that a "substitute's work was done wrong"). Two described "living with in-laws" and "bed-wetting," both of long duration, as causes; and three described probable results of the illness (conflict with mother-in-law, argument with mother, and difficulties with their superior) as "causes."

TABLE 8.—*Alcoholism in Mothers, Sisters, Fathers, and Brothers of 100 Patients with Manic-Depressive Disease and 50 Medically Sick Controls*

Group of Index Case	100 Manic Depressive Patients			Controls: 50 Medically Sick			Controls: 54 Healthy Soldiers			Significance Ratio, Patients vs. Controls
	Total No.	Alcoholics No.	Alcoholics %	Total No.	Alcoholics No.	Alcoholics %	Total No.	Alcoholics No.	Alcoholics %	
Mothers	99	1	1.0	50	0	...	54	0	...	1.03
Sisters	155	1	0.6	97	2	2.1	91	0	...	0.41
Fathers	99	7	7.1	50	2	4.0	54	2	8.7	1.01
Brothers	161	12	7.4	103	1	1.0	83	1	1.2	3.12

There then remained nine patients by whom events were mentioned that might reasonably and plausibly have been "causes" (they were not clearly symptoms or results, nor were there clear data to suggest that symptoms of this attack antedated the "cause"). These "causes" included (1) niece with cancer, (2) hysterectomy six years before, (3) things stolen from apartment, (4) tornado in Worcester, (5) two hurricanes, (6) husband's death, (7) thyroid operation six years before, (8) recent dilation and curettage; and (9) sister left home to be married and left her alone. Three of these patients had had previous attacks of manic-depressive disease. In five of these nine cases, the "cause" had occurred several years before admission.

Examples of the more intriguing "causes" from the whole group of 100 follow. One patient stated that hurricane Carol caused the trouble; however, there was good evidence that six weeks before hurricane

Carol the patient had many symptoms. Another patient complained that the illness was brought on because her niece went blind; actually her symptoms had started well before the blindness in the niece. One patient complained that the illness was caused by an operation on her sister, but the evidence was that the illness had started prior to this event. One complained that the illness was brought on by hysterectomy, when there was evidence that symptoms had occurred prior to hysterectomy. Examples of "causes" that are actually symptoms are as follows: One patient felt that she was no longer able to do her job right; another felt that automobiles made noise; another complained of lack of employment and another of too much work (in both of these cases it seemed that these "causes" were actually part of the disease).

TABLE 9.—*Frequency of Symptoms of Present Illness in Thirty-four Men and Sixty-six Women with Manic-Depressive Disease*

Symptoms	Men, %*	Women, %†
Headache	41	53
Blurred vision	32	32
Blindness	0	0
Double vision	6	2
Tinnitus	38	23
Hearing	15	23
Burning throat	3	3
Burning tongue	9	6
Burning rectum	9	8
Any burning‡	12	12
Dyspnea	77	77
Palpitation§	35	68
Chest pain	44	32
Anorexia	100	91
Nausea§	32	56
Vomiting	12	27
Indigestion	29	39
Abdominal pain	35	39
Weight change	88	88
Constipation	59	61
Diarrhea	38	32
Urinary frequency	71	55
Libido increased	4	10
Libido decreased§	83	53
Libido, no change	13	35
Libido increases and decreases	0	3
Paresthesias	47	56
Paralysis	0	2
Back pain	35	41
Joint pain	29	30
Extremity pain	15	30
Spells§	47	70
Weakness	50	56
Sleep	91	100
Crying§	53	82
Hysterics	100	100
Irritability	74	75
Energy	97	99
Temper increased	32	35
Temper decreased	24	20
Temper, no change	44	40
Drinking increased	36	25
Drinking decreased	42	25
Drinking changed§	79	48
Drinking, no change§	21	52
Suicidal thoughts	50	42
Fear of death	32	37
Fear of fainting§	9	31
Fear of losing mind	56	67
Poor concentration	82	83
Clarity of thought increased	3	3
Clarity of thought decreased	58	55
Clarity of thought changed	61	59
Clarity of thought, no change	39	42
Retardation of thought	47	50
Change of ideas	3	9
Speed of thinking increased	3	6
Speed of thinking decreased	73	61
Speed of thinking, no change	24	33
Distractibility	9	6
Memory	50	54
Hallucinations	0	11
Delusions	32	27

* Mean age, 49.1 yr.
† Mean age, 47.7 yr.
‡ Percentage of patients with burning of throat, tongue, or rectum.
§ Difference between proportions of men and women was significantly different, i.e., significance ratio greater than 2.

In some cases the events that were said to be causal had not actually happened. In one case there was an imaginary pregnancy. Another patient felt that poor business was the trouble, when objective evidence suggested that business had never been better for this patient. These "causes" were obviously not convincing. Eleven per cent of the manic-depressive patients and 6% of the medically sick controls had deaths in the family within a year of the onset of the illness—the difference not being statistically significant. Neither infection nor pregnancy occurred as a precipitating event.

Consequences of Illness.—In about a quarter of the manic-depressive patients, (24 of 100) there was evidence, either from the patient's statement or from outside information, that the illness had led to rather disheartening events, personal difficulties, or unfortunate decisions. One patient wrongly believed that his son had committed a crime and called the police; another sued friends, a candy company, and planned to sue a taxicab company with no clear-cut justification. Two patients were involved in automobile accidents, one while unreasonably irritated; another's business actually suffered. In three, marital infidelity occurred after the onset of symptoms. Excessive drinking was a problem in eight patients. In one this led to the husband's and daughter's threatening to leave home, and in another alcoholic hallucinosis appeared. Two had teeth removed for symptoms of depression. One purchased a home in May and sold it in February when he felt he had made a mistake. One changed jobs 30 times in a period of about five years; another married a woman who was eight months pregnant by another man in order to obtain "grace." One gave up his job, and another lost his job. These are apparent consequences, some simple and some bizarre, in patients with manic-depressive disease. In contrast, in the medically ill patients, two had retired from work because of illness. This demonstrates that manic-depressive disease causes profound personal and social disruptions in the lives of its victims.

Comment

This paper describes clinical observations in 100 patients with manic-depressive disease. The question immediately arises as to whether all these patients did, in fact, have manic-depressive disease. At present, one cannot go beyond saying that the patients had a psychiatric illness, that no other diagnosis could be made at the time nor could be made later to explain the symptomatology, and that the symptoms used in the systematic method of selection were those commonly referred to by students of the subject [2] as symptoms of manic-depressive disease. Exact and final diagnoses for each case must await crucial diagnostic tests, which as yet have not been developed. No chemical, anatomic, or psychological tests give reliable diag-

nostic information in this disease. The methods of selection led to fairly consistent results. Diagnoses in all the cases were believed to be manic-depressive disease by the method of best clinical impression, an approximation of what a clinically experienced psychiatrist tries to do. Eighty-three per cent of the cases fulfilled both selection criteria, the best-clinical-impression method and also the systematic method. No cases were admitted simply as undiagnosed cases, although this was possible according to the methods of selection.

Classification.—No attempt was made in selection to divide patients into those with manic-depressive disease and those with involutional melancholia, as the directions for making this separation contained in textbooks did not seem sufficiently clear. We felt that a few of the patients were obviously more manic than they were depressed, but many of the patients had many of the features commonly associated with "depressive" disease but a few of the features, such as overactivity and overtalkativeness, supposedly associated with "manic" disease. We have preferred to use the term "manic-depressive disease" rather than "manic-depressive psychosis." The term "psychosis" has so many meanings—that the patient is committable, that the patient has symptoms such as delusions and hallucinations, that the patient is "insane," and that the patient does not understand the "nature of reality," among others. Since these various meanings of "psychosis" are not necessarily consistent with each other, since many patients with manic-depressive disease do not fall into any of the above meanings of "psychosis," being merely patients who are tired and have insomnia, headache, and nervousness, and since understanding the "nature of reality" requires more confidence in one's understanding than some of us feel is necessary for simple psychiatric diagnosis, it seemed to us that the term "disease," implying that the patient is sick, nothing more and nothing less, was a better word.

Chief Complaints.—The information from the questionnaire is comparable to that obtained by a good doctor taking a history in a thorough manner. Therefore, the information gained in this systematic way should be useful to the physician who uses history as an indispensable tool of diagnosis. A few points should be emphasized about chief complaints and symptoms. The chief complaints are noteworthy in that many of them are quite local medical complaints, such as upset stomach, "pressure in my throat" and "bowels, they won't move," along with general medical complaints, such as being tired or exhausted. Table 2 shows that the chief complaints of localized medical nature are much higher in frequency in the medically sick controls. However, as far as general symptomatology of the present illness is concerned, it appears that local medical symptoms occur about as frequently in a group of manic-depressive patients as in a group of patients with assorted medical diseases. Table 2 suggests that the chief complaint of patients with manic-depressive disease is that of psychological abnormality in more than half the cases. This is in sharp contrast to the medically ill patients, in whom a chief complaint of psychological abnormality is unusual. These facts should be helpful in accurate diagnosis. When patients with definitely diagnosed medical disease have chief complaints, such as "no interest," "can't concentrate," "I am just all gone," and "unhappy," it is probable that the patient has two diseases, the medical illness and also manic-depressive disease.

Symptoms.—The symptoms of manic-depressive disease obviously are many in number (table 3) and involve many medical as well as psychological abnormalities. The high number of symptoms of the medical type has been pointed out before by Stone,[10] Campbell,[11] and others. Stone emphasizes the frequency with which patients with this disease are treated for other illnesses before the diagnosis is finally appreciated. It is probable that the difficulty in diagnosis is contributed to by the high number of medical

TABLE 10.—*Frequency of Some Symptoms of Present Illness in 100 Patients with Manic-Depressive Disease, 134 Patients with Anxiety Neurosis, and 50 Patients with Hysteria*

Symptoms	Manic-Depressive Patients, %*	Patients with Anxiety Neurosis, %†	Female Patients with Hysteria, %‡
Headaches	49	65	94
Blurred Vision	32	...	62
Blindness	0	0	20
Double Vision	3	...	10
Dyspnea	77	65	70
Palpitation	56	94	76
Chest Pain	36	81	...
Anorexia	94	36	78
Nausea	48	...	82
Vomiting	22	31	82
Abdominal Pain	38	...	78
Weight Loss	73	72	...
Constipation	60	...	54
Diarrhea	34	31	46
Urinary Frequency	60	32	...
Paresthesias	53	53	80
Paralysis	0	0	33
Back Pain	39	...	56
Joint Pain	30	...	28
Extremity Pain	25	...	62
Anxiety Attacks	33	70	74
Fainting Spells or Faintness	2	77	50
Weakness	54	70	...
Dizzy Spells	29	83	72
Insomnia	94	70	...
Weeping (Females)	54	...	78
Irritability	75	91	...
Fear of Death	35	42	...

* Mean age, 48.2 yr.
† Data from Cohen, White, and Johnson.[4a] Mean age, 39.03 yr.
‡ Data from Purtell, Robins, and Cohen.[5] Mean age: 37.5 yr.

symptoms. In addition, it seems that many physicians expect that the patient with manic-depressive disease should have had (*a*) a previous attack and (*b*) a manic attack in addition to a depressive attack. The truth of the matter is, however, whether one uses the terms "manic-depressive disease," or "melancholia," or both, the facts seem to be that many patients with this disorder, when seen by a physician, have not had a previous attack and have never had a manic attack.[2a] The patients in our group show an even lower proportion of characteristic manic attacks (6% of the 100) than those in the literature, but this might be accounted for by the nature of our psychiatric service, which was not oriented toward the combative or obstreperous patient. A Massachusetts state hospital admitted 48 manic-depressive patients during the same calendar year as that of this study. Twenty-one per cent of them showed predominantly manic reactions.[12] Kraepelin called 16.6% of 899 patients with this disease manic. Of special interest in manic-depressive pa-

tients is the fact that in about a half or more the symptoms—headaches, dyspnea, palpitation, anorexia, nausea, weight loss, constipation, urinary frequency, diminished sex function, paresthesias, and "spells"—occur. These "spells" (table 5) include so-called anxiety attacks, spells with giddiness and dizziness, and spells of confusion. Spells of these kinds are very unusual in medical disease and suggest either manic-depressive disease or other psychiatric diseases, such as anxiety neurosis (neurocirculatory asthenia) (table 10) or hysteria. Paresthesias and assorted pains are also common in these disorders.

Symptoms of a more psychological nature include insomnia, with special emphasis on early morning waking. Patients also complain characteristically that their sleep is not good sleep or not restful sleep. Suicidal thoughts were admitted by almost half the patients in their questionnaire interview. It is probable that in clinical practice the occurrence of this symptom is much higher. Fear of losing mind is a characteristic symptom of manic-depressive disease, as well as feelings of fear of death and fear of fainting, which are also seen in anxiety neurosis (neurocirculatory asthenia) and hysteria.[12A] Statement by the patient of poor concentration, unclear thinking, slower thinking, and poor memory are common symptoms of depression and are not often seen in medical disease. Finally, signs of untidiness, immobile facies, and tremor of the outstretched fingers are common in depression and occur only rarely in medically ill patients. The data suggest, therefore, that, although many symptoms occur in manic-depressive disease, some are special features. A diagnosis should not be missed if appropriate inquiry is made of the patient.

Our investigation of the history of patients with manic-depressive disease did not coincide with our clinical impression or the clinical impression of others[2d] that there is a psychologically typical person who gets manic-depressive disease. Study of the person before disease occurred, as is done retrospectively, involves the difficult problem of deciding whether symptoms in the past represent "character" or previous attacks of the illness. Perhaps this will never be decided until there are objective and quantitative methods of deciding about manic-depressive "personality" as contrasted with manic-depressive disease. At present state of knowledge, it is possible that a follow-up study of patients believed to have the crucial characteristics of the manic-depressive "personality" might yield some information as to what proportion of these individuals actually later develop manic-depressive disease, as compared to patients who do not have this kind of "personality." An opinion on this could profitably be postponed until such data are actually collected.

There seemed no practical way to divide these patients into groups of patients with melancholia and those with manic-depressive disease. Meyer[13] suggested that the term "melancholia" be dropped. Over the centuries the term "melancholia" has been used in an ill-defined manner, in its earliest days, perhaps, to mean nothing more specific than insanity and in later years to denote some variety of depression that came on later in life and in some way was related to the female menopause. Various special meanings of this term have been used, and sometimes the meaning is not clear at all, but, traditionally, psychiatric writers have felt that it is proper to separate "manic-depressive disease" from "melancholia," although they never made it clear what they were separating from what. In this study women over 45 years of age having their first attack did not show any symptomology different from the rest of the patients in the study. Dreyfus'[14] detailed monograph on 85 well-studied cases shows no basis for a separation of "melancholia" from "manic-depressive disease." At the date of writing the present report, it would not be possible to prove whether manic-depressive disease is one disease or many diseases. Until an objective method of diagnosis or the cause is discovered, arguments as to whether one condition is the same as another or different are rather useless vocabulary exercises, and it is possible that there is enough of this particular activity in psychiatry already. Nor will evoking cliches such as "multiple causation" add anything more than more words to the problem. Our studies do not settle the problem in any way, they simply suggest that the attempt to separate manic-depressive disease from so-called involutional melancholia does not seem feasible from the data, and the literature does not solve the problem either. The genetic approach thus far seems the most promising[15a] but still has not settled the question, possibly because of difficulties with precise clinical diagnosis. It is even possible that the group of cases described here as instances of manic-depressive disease may constitute a number of different illnesses.

The connection with alcoholism was striking. This has been noted before; Slater[22] pointed out that 10.7% of fathers of manic-depressive patients were alcoholics. Kraepelin stated that alcoholism was seen in the parents of patients with manic-depressive disease, but he did not give supporting data. He also noted that alcoholism occurred in about a quarter of the male patients. Stenstedt[7] found 5.3% of fathers of manic-depressive patients were alcoholics and believed this was not a significant finding, but he had no control data. In this study, as in Kraepelin's studies, some of the patients with clear-cut manic-depressive disease also could have been referred to as "alcoholics." The fact that a number of patients increased their alcohol consumption while they were ill with manic-depressive disease suggests the obvious possibility that these patients take alcohol as a preferred medication for their symptoms.

Nothing thus far has been said about the cause of manic-depressive disease. Our studies did not bear on the matter. We found it difficult even to corroborate the notion that "precipitating events" are common in manic-depressive disease. It can be seen that, although patients, like psychiatrists, express definite opinions as to what brought on illness, the patients, like some psychiatrists, do not have conclusive data to support their opinions. In some patients nothing that even sounded like a precipitating event was forthcoming, and in others events that had happened after the onset of the illness were referred to as precipitating events. In some cases what were called precipitating events were obviously consequences of the

illness. In some patients the events had not happened at all, as in one patient who believed that her illness was brought on by pregnancy. The patient did not happen to be pregnant. Pregnancy did not emerge as an obvious precipitating event, although no intensive study of this was made. Deaths were not statistically more common preceding depressions than they were before medical disease. Deaths have also been said, without adequate controlled data, to be the psychogenic factor in ulcerative colitis [16] as well as in depressions, but there was also no evidence of that here. Thus far the literature on the origin of manic-depressive disease suggests that there must be a strong hereditary factor in the disease. A summary of studies on twins [15A] suggests that a high proportion of identical twins of manic-depressive patients have the disease, in contrast to a significantly lower rate in fraternal twins of manic-depressive patients.

Over the centuries various attempts have been made to explain symptoms and their mechanisms, beginning with the four ancient humours (Hippocrates and Burton [1]). The following statement on "melancholia" is from a 19th century "school," that of Freud [18]: Our material here is limited to a small number of cases the psychogenic nature of which was indisputable. . . . We have elsewhere described how object-choice develops from a preliminary stage of identification . . . the ego first adopts an object and the ambivalence in which this is expressed. The ego wishes to incorporate this object into itself, and the method by which it would do so, in this oral or cannibalistic stage, is by devouring it. Abraham is undoubtedly right in referring to this connection the refusal of nourishment met with in severe forms of melancholia. . . . On the assumption that the results of observation would accord with our inferences, we should not hesitate to include among the special characteristics of melancholia a regression from object-cathexis to the still narcissistic oral phase of the libido.

Such statements might conceivably explain the symptom "refusal of nourishment," but, even if Abraham is "undoubtedly right" about "refusal of nourishment," it is not clear that the explanation offered would also explain dyspnea, palpitation, tinnitus, urinary frequency, insomnia, and the three score and more symptoms listed in table 3. Actually statements such as the above quotation have no clear meaning to begin with, have no basis in fact, and are examples of a type of unscientific thinking from the last century that is still prevalent in some localities.

Consequences.—One should point out and reemphasize the problem of the consequences of manic-depressive disease. Often these are thought of carelessly as the "causes" or precipitating events. Besides suicide and alcoholism, patients with this disease resign their jobs, sell their homes, get divorces, or make unfortunate, inappropriate decisions. A physician should be aware of this type of abnormal behavior in this disease. Thus, preventive psychiatry cannot today protect an individual against this disease or prevent a recurrent attack. However, accurate diagnosis and proper management should prevent the unfortunate consequences.

It is believed that, if physicians will examine patients for the symptoms and signs described here, they will find in their practice many patients who have manic-depressive disease. Many ill-defined diagnoses, such as "neurotic" and "psychosomatic," should disappear with careful examination, and both the individual patient and medical science will benefit.

Conclusions

Manic-depressive disease is one of the commonest of psychiatric diseases. This fact may be obscured by the multiplicity of symptoms, often mistakenly interpreted as revealing medical disease or "neurosis." The textbook picture of manic excitement alternating with "retarded depression" is the unusual rather than the usual manifestation of this disease, as suggested by the data of this study and the factual psychiatric literature. It is possible that the picture of the disease seen in office practice and on "acute" psychiatric wards may differ from that of the very severe case seen in state hospitals and sanatoriums.

The medical symptoms of the illness (head, cardiovascular, gastrointestinal, genitourinary, neuromuscular) occur in about the same frequency and distribution as in patients on a ward of medically sick patients. The manic-depressive patients, however, show a high frequency of psychological and mood disturbances, such as poor concentration, irritability, suicidal thoughts, feelings of "slow thinking," fears, including fear of "losing mind," and abnormal mood. These symptoms are rare in medically ill patients. The medical and personal history of manic-depressive patients before the first episode of disease does not differ remarkably from that of medically ill patients. Events or difficulties that could reasonably be considered as causal or as precipitating events were rare, but patients described frequently what we consider as symptoms or consequences of the illness as "causes." In the manic-depressive group were found patients diagnosed as alcoholics, who it seemed were using alcohol as a therapeutic agent, i. e., to make them feel better. It is also noteworthy that, in fathers and brothers of manic-depressive patients, there is a higher prevalence of alcoholism than in the fathers and brothers of control subjects, those both medically sick and healthy.

Manic-depressive disease can be diagnosed by the usual medical procedure of using history, examination, and laboratory data. Clinical observations, rather than unproved psychological theories, should be used as the basis of differential diagnosis and of selection of patients for scientific research in this disease.

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Statistical calculations for this study were made by Mrs. Dian Fortunato.

Because of space limitations, some of the bibliographic references have been omitted from THE JOURNAL. They, as well as appendixes 1 and 2, are included in a complete manuscript, deposited with the American Documentation Institute, Auxiliary Publications Project, Photoduplication Service, Library of Congress, Washington 25, D. C.

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MASS SCREENING OF THE TOTAL FEMALE POPULATION OF A COUNTY FOR CERVICAL CARCINOMA

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• *Cytological examinations were carried out on smears obtained directly from the endocervical canal with the aid of a speculum or less directly by using a special cancer detection tampon. The 17,761 women so studied by 27,894 smears represented practically the entire female population over the age of 19 years in the county. Cancer cells were found in the specimens of 117 patients; biopsy material was obtained from 84 of these. Carcinoma in situ was found in 56 women (2 of whom were 19 years of age) and invasive carcinoma was found in 28. The average age of women with carcinoma in situ was 39; that for carcinoma in situ with early invasion, 41.6; and that for frankly invasive cancer, 47.8. For the total white female population the prevalence rate of cervical carcinoma in situ was 2.8 per 1,000 and for invasive cancer 1.4 per 1,000. To determine the true incidence rate for cervical carcinoma in situ, repeat examinations were carried out over a period of four years on women known not to have had a cervical lesion at the time of the first examination. The data for incidence indicated that, in every 1,000 women, 1.8 new cases of cervical carcinoma in situ developed each year. There was reason to believe that the figures for prevalence and incidence obtained in this county would be valid for the United States as a whole.*

The screening of the female population of Floyd County, Georgia, for cervical carcinoma was instituted in September, 1951. At that time the value of the cytological method for the detection and diagnosis of cervical cancer was well substantiated by numerous investigators.[1] Theoretically, it appeared that carcinoma of the cervix uteri could be eradicated by the routine application of the cytological technique. However, several important factors in regard to screening techniques and rate of development for this type of cancer were unknown.

To control this disease the diagnosis has to be made in the curable stage, in which the carcinoma is noninvasive and usually asymptomatic. No information was available as to how many such intraepithelial lesions develop in the female population each year. Therefore, this project of mass screening was planned primarily for the purpose of ascertaining true incidence rates for cervical carcinoma. Once this was known, the cost of cancer control and the frequency at which the test should be performed could be established. Floyd County, Georgia, was chosen for its static population of approximately 15,000 to 20,000 women above the age of 19 years.

Method of Investigation

An attempt was made to reach women of all social and economic strata in the county, with particular emphasis on those without complaints. All efforts were directed toward obtaining an adequate cross section of the female population by intensive publicity. The Georgia State Health Department provided posters, pamphlets, and health educators to carry the message to such places as homes, churches, and women's clubs. The local chapter of the American Cancer Society cooperated in the program by the arrangement for publicity through newspapers, radio, television, clubs, and churches and in the enlistment of volunteer workers.

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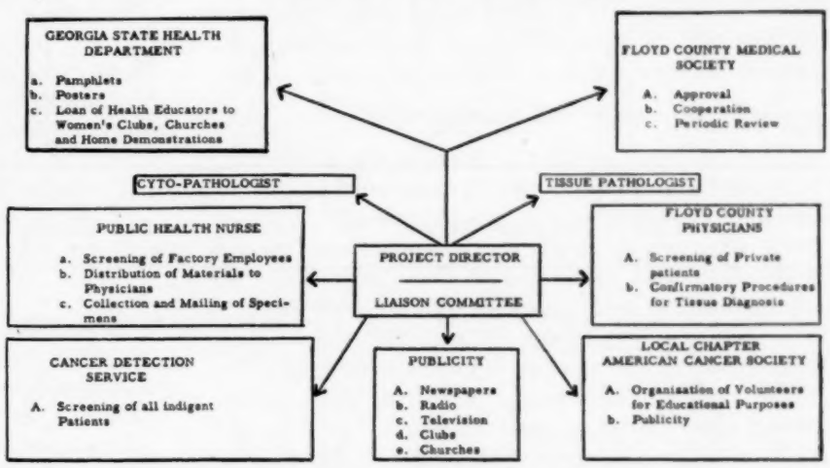
Read before the Section on Obstetrics and Gynecology at the 106th Annual Meeting of the American Medical Association, New York, June 7, 1957.

Routine examinations were carried out in a special cancer detection center for indigent persons. A full-time public health nurse was engaged to assist in the examination of all employees in the cotton mills and other factories. Smears were taken routinely in the offices of 27 physicians in Floyd County. Materials necessary for the test were supplied to the physicians twice weekly, at which times the smears were collected (see figure).

Cytological Technique.—After insertion of a speculum, the smears were taken with a cotton applicator directly from the endocervical canal. This method was employed in order to obtain the highest degree of accuracy. To omit the introduction of a speculum may result in a loss of about 50% accuracy when material is taken from the posterior fornix.[2] Possibly mass screening for cervical carcinoma of the female population may be carried out in a shorter period if the use of a speculum is not required. That this would compensate for the number of women who would thus escape detection of a potentially malignant lesion is doubtful. Furthermore, the introduction of a speculum assures inspection of the cervix in each case.

A copy of each suspicious or positive report was mailed to the local pathologists, while a copy of the tissue diagnosis along with a duplicate of the tissue section was received by the project director in each case. In the beginning of the screening project, the smears were fixed in ether alcohol and preserved in glycerin for mailing. This procedure became unnecessary when a process of rehydration was elaborated which permits the drying of smears in air and mailing them without preservation in glycerin.[3] In order to further increase the number of tests, an especially prepared cancer detection tampon with a device for automatic preparation of the smear was distributed to the population.[4]



Organization of mass screening program, Floyd County, Georgia, 1951 to 1955.

Evaluation of Data.—The value of a screening program for cancer is determined by the number of carcinomas detected in relation to the number of women examined for a given period. However, a large number of variable factors enter into the analysis of such data, each of which factors may affect the statistics considerably. Nothing short of a complete statistical analysis will do justice to an investigation of this importance. Adequate evaluation can only be made if the proportion is known of the number of women tested according to such factors as routine or selective screening, age group, race, and social stratum. In addition, it is significant to consider the technique of the test employed, the criteria applied for cytological examination, the type of biopsy performed, and the criteria for the histopathological diagnosis.

With the help of the Division of Cancer Control and Research and the Bureau of Records and Statistics of the New York City Department of Health, IBM punch cards and machines were used in the analysis of the data from the Floyd County project. The results of 27,894 examinations are presented here in the form of prevalence tables, an incidence table, and a table showing intervals from stage to stage of development.

Prevalence, stated simply, means the number of cases of a given disease present in the population at a given time. It is customary to indicate prevalence in the form of a rate, specific for selected age groups. Such rates do not indicate how long the disease has been present nor the rate of development. "Prevalence rates" should not be confused with "incidence rates," which may be used erroneously to express prevalence of a disease. Tables 1 and 2 show prevalence in terms of what was found on the first examination of the women screened.

Incidence, stated simply, means the number of new cases of a disease which develop in a specified time, usually a year, in a population group of a given size that was known not to have the disease at the time of the first examination.[5] It is customary to express incidence as a rate per year specific for selected age groups. The rate may be expressed as a percentage or in terms of the most appropriate unit for the denominator. The incidence rates presented in table 3 were arrived at from the "life table" derived from the follow-up or repeat examinations of 4,482 white women, each of whom had had negative results on the first examination and had been followed up for at least six months. The length of follow-up ranged from six months to four years.

Average duration from stage to stage of development (table 4) was derived simply by taking an average of the number of months between significant examination dates. A total of 590 women in whom results were negative on first examination and who had completed less than six months of follow-up were omitted from this table. Among these women were found six cases of carcinoma in situ and two cases of invasive carcinoma. None of these data are included in the incidence table.

The unit of exposure is the customary "person-year." This is the equivalent of one person followed for one year. As is customary, it is assumed that withdrawals and significant conditions occurred uniformly throughout the period. Withdrawals have been treated as having occurred, on the average, midway between the

last negative examination and the completion of the observation year. Significant findings have been treated as having occurred, on the average, midway between the first borderline finding date and first positive finding date. If no borderline findings were reported, positive cases were assumed to have occurred midway between the last negative date and the first positive date. Length of observation was reported in months and converted to years simply by dividing the total months by 12. The number of person-years for the Negro women screened is too small to permit any valid comparison with findings among white women.

Criteria for Diagnosis.—In the cytological interpretation, all slides which failed to reveal endocervical material were designated "unsatisfactory." Cellular changes were recorded according to the epithelial layer of cellular origin and the degree of cellular alteration. This was reported as indicative of slight, moderate, or marked epithelial dysplasia or suggestive of either carcinoma in situ or invasive carcinoma or simply carcinoma. Recommendations were made to repeat the examination either immediately or in 3, 6, or 12 months, unless immediate biopsy specimens were requested.

The biopsy material was submitted to the Floyd County pathologists, Drs. Stergus and Peterson. Serial sections were cut in the case of positive smears. A diagnosis of carcinoma in situ was made when all changes which occur in the presence of invasive cervical carcinoma, except for invasion of the underlying stroma, were found.

Results

Prevalence Rates.—From September, 1951, to December, 1955, a total of 27,894 tests were carried out in Floyd County on 17,761 women. Of these, 16,604 were white and 1,157 were Negro women. Repeat examinations at periodic intervals were performed on 4,716 women, of whom 234 were Negroes. The number of examinations carried out by the Floyd County physicians and the public health nurse by direct collection of the material from the endocervix was 25,422, while 2,472 smears were obtained by the cancer detection tampon method.

Total Female Population.—Of the 17,761 women screened, the smears of 117, or 6.6 per 1,000, were found to contain cancer cells (table 1). Biopsy specimens were requested for these women, and confirmation to date is available on 84, or 4.7 per 1,000. Carcinoma in situ was found in 56 women, or 3.9 per 1,000, and invasive carcinoma in 28, or 1.6 per 1,000. In 33 cases, or 1.8 per 1,000, the presence of carcinoma has not been confirmed to date. Two cases of carcinoma in situ were present in women 19 years of age; in 74 patients, or 4.2 per 1,000, borderline changes were detected by cytological evaluation.

The development of cervical carcinoma appears to be age-specific. Therefore, all rates should be presented and evaluated according to age groups. The largest number of cases of carcinoma in situ occurred in the age group 41-50 at a prevalence rate of 5.5 per 1,000 and in the age group over 60 at the rate of 5.8 per 1,000, while invasive carcinoma was found at the highest rate of 8.2 per 1,000 in the age group over 60. A total of 73% of these women harbored a carcinomatous lesion which was not suspected. Carcinoma in situ was asymptomatic in 92%, while invasive carcinoma was unsuspected in 35% of cases.

White Female Population.—A total of 16,604 white women were examined for cervical carcinoma (table 2). Ninety-seven smears, or 5.8 per 1,000, contained

TABLE 1.—*Prevalence Rates in Terms of Findings on First Examination of the 17,761 Women Screened in the Floyd County, Georgia, Project, 1951-1955*

Age Group	Women, No.	Borderline Changes		Carcinoma in Situ				Invasive Carcinoma		Carcinoma in Situ and Invasive Carcinoma		Confirmed Carcinoma in Situ and Invasive Carcinoma	
				Confirmed		Unconfirmed							
		No.	Rate/1,000	No.	Rate/1,000	No.	Rate/1,000	No.	Rate/1,000	Total No.	Rate/1,000	No.	Rate/1,000
Under 20	1,064	7	6.6	2	1.9	...	...	...	...	2	1.9	2	1.9
20-30	6,256	23	3.7	10	1.6	9	1.4	2	0.3	21	3.3	12	1.9
31-40	4,908	23	4.7	17	3.4	12	2.4	9	1.8	38	7.7	26	5.2
41-50	3,267	8	2.4	18	5.5	6	1.8	6	1.8	30	9.1	24	7.3
51-60	1,411	7	5.8	4	2.8	4	2.8	4	2.8	12	8.4	8	5.6
Over 60	855	6	7.0	5	5.8	2	2.3	7	8.2	14	16.3	12	14.0
Total	17,761	74	4.2	56	3.9	33	1.8	28	1.6	117	6.6	84	4.7

TABLE 2.—*Prevalence Rates in Terms of Findings on First Examination of White Women Screened in the Floyd County, Georgia, Project, 1951-1955*

Age Group	Women, No.	Borderline Changes		Carcinoma in Situ				Invasive Carcinoma		Carcinoma in Situ and Invasive Carcinoma		Confirmed Carcinoma in Situ and Invasive Carcinoma	
				Confirmed		Unconfirmed							
		No.	Rate/1,000	No.	Rate/1,000	No.	Rate/1,000	No.	Rate/1,000	Total No.	Rate/1,000	No.	Rate/1,000
Under 20	935	5	5.3	1	1.1	...	...	...	...	1	1.1	1	1.1
20-30	5,815	19	3.3	7	1.2	7	1.2	1	0.2	15	2.5	8	1.3
31-40	4,638	21	4.5	13	2.8	8	1.7	8	1.7	29	6.4	21	4.5
41-50	3,077	7	2.3	17	5.5	6	1.9	5	1.6	28	9.1	22	7.0
51-60	1,333	6	4.5	4	3.0	4	3.0	3	2.3	11	8.3	7	5.3
Over 60	806	5	6.2	5	6.2	2	2.5	6	7.4	13	16.1	11	13.6
Total	16,604	63	3.8	47	2.8	27	1.6	23	1.4	97	5.8	70	4.2
Total Negro	1,157	11	9.5	9	7.8	6	5.2	5	4.3	20	17.3	14	12.1

malignant cells, on which basis biopsy specimens were requested. Carcinoma was found in tissue sections of 70, or 4.2 per 1,000 cases. In these, a diagnosis of carcinoma in situ was made in 47, or 2.8 per 1,000, while invasive cancer was present in 23, or 1.4 per 1,000. Borderline changes according to cytological evaluation were detected in 63, or 3.8 per 1,000, specimens. The noma in situ was made without subsequent confirmation by tissue diagnosis. Five of these patients had negative smears after negative biopsy findings, while in three patients cancer cells were persistently found after biopsy specimens had failed to reveal malignancy. In three cases no biopsy specimens were obtained to date.

TABLE 3.—*Significant Findings on Repeat Tests of 4,482 White Women Whose First Examination Had Been Negative and Who Had Completed at Least Six Months of Follow-up, 1951-1955*

Age Group	Women, No.	Person-Years Observed, Total No.	Carcinoma in Situ: Confirmed No.	Carcinoma in Situ: Confirmed Rate/1,000 Person-Yr.	Carcinoma in Situ: Unconfirmed No.	Carcinoma in Situ: Unconfirmed Rate/1,000 Person-Yr.	Early Invasive Carcinoma No.	Early Invasive Carcinoma Rate/1,000 Person-Yr.	Carcinoma in Situ and Invasive Carcinoma No.	Carcinoma in Situ and Invasive Carcinoma Rate/1,000 Person-Yr.	Confirmed Carcinoma in Situ and Invasive Carcinoma No.	Confirmed Carcinoma in Situ and Invasive Carcinoma Rate/1,000 Person-Yr.
Under 20	251	437	..	..	..	..	..	..	..	..	..	..
20-30	1,688	3,182	6	1.6	3	0.9	1	0.3	10	3.7	7	2.2
31-40	1,297	2,644	2	0.8	5	1.9	1	0.4	8	3.0	3	1.1
41-50	780	1,624	2	1.2	3	1.8	1	0.6	6	3.7	3	1.8
51-60	324	680	2	2.9	..	..	1	1.5	3	4.4	3	4.4
Over 60	142	295	..	..	..	..	..	..	..	..	..	..
Total	4,482	8,862	12	1.3	11	1.2	4	0.4	27	3.0	16	1.8

peak for carcinoma in situ appears in the age group 41-50 at a rate of 5.5 per 1,000 and again in the age group over 60 at a rate of 6.2 per 1,000. Invasive carcinoma was found at the highest rate of 7.4 per 1,000 in the age group over 60.

Negro Female Population.—In view of the small number of Negro women examined, a breakdown into age groups was omitted. The over-all prevalence rate for carcinoma in situ appears to be 7.8 per 1,000, while that for invasive carcinoma is 4.3 per 1,000 (table 2). Thus, the total rate for cervical carcinoma in the Negro population is 12.1 per 1,000.

Reexamination and Follow-up

Of the 16,604 white women who were screened for cervical carcinoma, 4,482 women who had negative findings on the first examination had a total of 9,309 repeat tests at periodic intervals from 1952 to 1955. Only the women who had repeat examinations at intervals of six months or longer are included in the follow-up series. Likewise, the patients who developed cervical carcinoma in a period less than six months after their first negative examination were omitted from these data (table 3).

Twelve of the women with repeat examinations developed carcinoma in situ, while in an additional four signs of early invasion were present at the time the tissue diagnosis was made. According to the "person-year" table (table 3), the incidence rate of cervical carcinoma in situ appears to be 1.8 per 1,000, with the highest incidence of 4.4 per 1,000 in the age group 51-60.

The 16 cases of carcinoma represent 3.5 per 1,000 which developed during an average period of 25.3 months. This suggests that 1.68 per 1,000 new cases of cervical carcinoma developed in this population group every year. In 9 of the 16 patients with carcinoma, borderline changes were noted after the first negative finding before cancer cells could be found in the subsequent biopsy specimens. In three of the remaining seven patients, negative smears were obtained repeatedly before a positive diagnosis was made. In 11 patients a cytological diagnosis of carci-

Repeat smears and positive tissue findings are available on eight women in whom the first smear revealed atypical cells which were interpreted to derive from borderline epithelial changes. These cases, however, were omitted from our incidence table. The average period of observation in this group was 5.8 months.

Self-Obtained Dry Smears

An attempt was made to increase the number of examinations by the use of a specially designed tampon.[4] About 11,000 tampon kits were distributed in Floyd County. Over a period of about two months, 2,472 pairs of smears were returned to our laboratory. Seven hundred two, or 28%, of these were considered unsatisfactory according to our standards, since they failed to contain endocervical material, although there was an abundance of squamous cells of vaginal origin. The number of smears with malignant cells on the basis of which biopsy specimens were requested occurred at the rate of 6.2 per 1,000; this compares favorably with the method of endocervical smears. The detailed results of this phase of the investigation will be reported at a later date.

TABLE 4.—*Average Periods Between First Examination and Subsequent Diagnosis of Carcinoma in Situ or Invasive Carcinoma in White Women*

First Cytological Examination	Tissue Diagnosis* (Cytological Evaluation for Borderline Changes)	Mo., Av.	Range in Mo.
Negative	Borderline	17.3	4-30
Borderline	Carcinoma in situ	5.8	1-15
Negative	Carcinoma in situ	22.4	6-39
Negative	Carcinoma in situ with early invasion	28.2	21-40

*Final examination.

Comment

The evaluation of this study must necessarily be influenced by the acceptance or negation of the basic principle of the entity "carcinoma in situ." Numerous reports in the literature attest to its significance as a forerunner to frank invasive cervical carcinoma.[5] Furthermore, extensive analysis of the data presented on

the Floyd County project suggests the importance of carcinoma in situ as a developmental stage of cervical carcinoma.

In the 12 confirmed cases of cervical carcinoma in situ, the average time between the first negative finding and the development of borderline changes appears to be 17.3 months (table 4). In the group in which the first smear revealed borderline changes, the duration for the development of carcinoma in situ was an average of 5.8 months. The total duration from the first negative examination to the diagnosis of carcinoma in situ with early invasion was an average of 28.2 months.

The time intervals possibly synonymous with carcinogenic transformation are consistent in all four groups. The average age of patients with carcinoma in situ is 39; that for carcinoma in situ with early invasion, 41.6; and that for frank invasive cancer, 47.8. The difference between these average ages, however, does not imply the duration of malignant transformation. The number of women screened routinely in each age group varies considerably, and thus by this circumstance alone the average age is determined, unless corrected for an equal number of women screened in each age group.

Whether any inference as to the carcinogenic process may be drawn from the comparison of the prevalence rates from tables 1 and 2 to incidence rates from table 3 is not certain. Although the total number of women screened presents approximately the total number of female inhabitants above the age of 19 in Floyd County, a certain degree of active selection through physicians' offices and screening programs in factories may have occurred. In addition, a certain number of women routinely screened were available through self-selection induced by the publicity over radio and television and at women's clubs and churches. The same factors apply to the group of women who submitted for repeat examinations. Self-selection in this group may perhaps be associated with a different type of women than that type who had one single examination. On the other hand, possibly a greater degree of active selection applies to this group, since a large number of women were reexamined in the cotton mills and other factories of Floyd County.

It is not intended to imply in this presentation that the rates found in Floyd County through a mass screening program for cervical carinoma apply to the entire female population. It may be stated, however, that these rates are probably an indication of what the true rates may be for the white female population of other areas.

Summary

A program of mass screening was instituted in Floyd County, Georgia, for the detection of cervical carcinoma, with the object of determining by reexamination the true incidence indicative of the rate of development for this type of cancer. In 15,289 cases, the endocervical smear technique which requires the introduction of a speculum was used. An additional 2,472 women were examined with a specially designed cancer detection tampon. During the project, the dry smear method was instituted; this allowed fixation of smears in air and mailing of them without preservation in glycerin. Subsequent rehydration and fixation of smears were carried out in the laboratory.

A total of 27,894 examinations were made on 17,761 women from September, 1951, to December, 1955. The total number of positive smears was 144, of which confirmation by tissue diagnosis is available to date on 100 cases. On first examination a total of 4.7 per 1,000 patients were found to have cervical lesions; of those, 3.9 per 1,000 had carcinoma in situ and 1.6 per 1,000 invasive carcinoma. In the white female population the total number of cervical lesions appeared to be 4.2 per 1,000, with a rate of 2.8 per 1,000 for carcinoma in situ and 1.4 per 1,000 for invasive carcinoma. The highest rate for carcinoma in situ was found in the age groups 41-50 and over 60, while the peak for invasive carcinoma appeared in the age group over 60.

On reexamination of 4,482 white women who had had negative findings by the first test, 3.5 per 1,000 were found to have carcinoma in situ after an average period of observation of 25.3 months. This indicated that in every 1,000 women, 1.68 new cases of cervical carcinoma in situ had developed each year. In four of these patients with carcinoma in situ, signs of early invasion were noted. According to the "person-year" table, the incidence rate for cervical carcinoma in situ is 1.8 per 1,000 per year.

A significant difference in duration appears to occur in different groups between negative findings to borderline changes, to carcinoma in situ, and to carcinoma in situ with early invasion and between borderline changes and carcinoma in situ. Whether any inference can be drawn to the rate of malignant transformation of cervical carcinoma is not certain.

It must be emphasized that the data reported apply to Floyd County and the circumstances under which the mass screening was carried out. However, in consideration of the partly active selection and partly self-selection of the women examined, the methods employed, follow-up studies, and age groups presented, it is suggested that these rates are indicative of what the true rates may be in the entire white female population over the age of 19 years in the United States.

Beth-El Hospital, Linden Boulevard and Rockaway Parkway (12) (Dr. Nieburgs).

This study was done in cooperation with the Floyd County (Ga.) Medical Society and the Division of Cancer Control and Research and the Bureau of Records and Statistics of the New York City Department of Health.

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SPINAL CORD INJURY—REHABILITATION COSTS AND RESULTS AND FOLLOW-UP IN THIRTY-ONE CASES

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• *Patients with paraplegia resulting from peacetime accidents are aided by the same programs of rehabilitation that were developed for the management of wartime cases. A group of 31 patients with severe paralyses in the lower extremities after spinal cord injuries were admitted to a course of training in self-care and mobility, bowel and bladder control, and psychosocial and vocational adjustment. Complications arising in 20 of the 31 patients necessitated additional surgical or medical care during the training period. Each patient was studied again not less than one year after returning home. At this time 13 were employed full time in jobs and 10 others were in vocational training programs preparatory to employment, as contrasted with 24 who had been unemployed and economically dependent before admission to the rehabilitation program. The follow-up study demonstrated the sustained effectiveness of the physical and vocational rehabilitation for most of the patients. The costs of the total program, including transportation to and from the rehabilitation center, have been computed and demonstrate its economic advantages. To these economic considerations must be added many intangibles, especially the psychological gains to the patient and to the people in his immediate environment.*

During World War II there were 2,500 cases of traumatic paraplegia in which successful medical management and eventual rehabilitation highlighted significantly the advances of recent decades in medical, surgical, psychiatric, nursing, psychosocial, and hospital care.[1] This success in the treatment of the wartime cases brought attention to focus on the problems of civilian patients with paraplegia who, as a result of peacetime accidents, might also benefit from the application of these new techniques. Hence, in the postwar years, agencies and individuals charged with the care of such patients have sought treatment for them in centers specializing in programs of total rehabilitation.

This paper describes the immediate and follow-up rehabilitation results with an unselected group of 31 patients with spinal cord injury who were sent to the Institute of Physical Medicine and Rehabilitation of the New York University–Bellevue Medical Center by the Division of Vocational Rehabilitation of the Department of Education of the state of Georgia during the period December, 1950, to March, 1953. The group was comprised of adults ranging in age from 18 to 46 years who, as a result of injury to the spine, had sustained traumatic transverse myelopathy; 29 of the group had paraplegia and 2 quadriplegia.

In the analysis of the procedures, complications, duration, costs, and results incident to a rehabilitation program for such a group of patients, it was considered desirable to study a group referred for treatment by a single responsible agency; it was felt that the interest of a single such agency in the eventual integration of the patient into the life of his home community would provide more uniform and precise data regarding the patients both during and after treatment. In all of the cases reported, close cooperation was maintained with the patient's vocational counselor in his home state during rehabilitation treatment, and joint planning toward realistic vocational rehabilitation was carried out during this time by conference and correspondence. This liaison was revived at the time of the

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follow-up study, when a questionnaire was jointly devised to supply information on the physical, self-care, social, economic, and vocational status of each patient in the group after a period of at least one year after discharge from the rehabilitation program.

Method of Study

For the tabulation of data on the duration, costs, and results of rehabilitation training for this group of cases, the complete record of each patient from the institute was reviewed. In those instances where the patient had required medical or surgical treatment at the University Hospital of the New York University—Bellevue Medical Center in addition to physical rehabilitation at the institute, this hospital record likewise was screened. Appropriate data from these histories were then recorded for each case on separate study sheets. In addition, as a follow-up for the study, each patient in the group was visited in his home by a counselor of the Georgia Division of Vocational Rehabilitation. A prepared questionnaire was used in this direct interview, and the replies were recorded by the counselor and submitted to us for analysis.

Pretreatment Status of the Study Group

Age, Sex, and Marital Status.—The patients' ages ranged from 18 to 46 years, with an average of 29 years. Twenty-six of the patients were males, 21 white and 5 Negro, and 5 were white females. The average age of the male patients was 30 years and of the female patients, 24. Eleven male patients were married, one was separated, and 14 were single. All of the 11 married men in the group had children. One female patient was married, one was separated, and three were single.

Diagnosis, Extent, and Type of Disability.—All of the patients in this study group had sustained spinal cord injuries, with resultant paralysis of the lower extremities; two of the group with injury at the seventh cervical level were paralyzed in all four extremities. Sixteen patients had spastic and 15 flaccid paralysis.

Duration of Illness.—Five patients had been disabled for more than 10 years, five for more than 5 years but for less than 10, and nine from 2 to 5 years. Twelve had been disabled less than two years and, of these, seven less than one year.

Circumstances of Trauma.—Trauma had been the cause of disability in all 31 of these cases. Auto accidents accounted for 12, gunshot wounds for 9, blows from moving objects for 5, falls for 4, and a diving accident for one. Among the nine patients with gunshot injuries, hunting accidents accounted for four, while five were the result of assault.

Previous Medical Care.—Every patient had had previous medical and surgical care in a local hospital. While records of previous medical care were not complete in every instance, the abstracts and records of previous care that were incorporated in the patients' records at the New York University—Bellevue Medical Center showed that the group had spent periods ranging approximately from three weeks to as long as three years under treatment in hospitals. The estimated average previous period of hospital care for the group was about four months. Twenty-two of the patients had had a laminectomy, and in more than half of these cases this surgery had been performed early, within the first 10 days after injury. Complicating urologic problems requiring surgery and decubitus ulcers had accounted for hospitalization in many instances.

While a few male patients had devised their own home-methods for self-care, previous definitive rehabilitation care and training had been available to only one-third of the group. With only one or two exceptions, the latter type of care and training had not been intensive and had not been geared to the total, i. e., the physical, social, and vocational, rehabilitation of the patient, such as was implicit in the referral by the Division of Vocational Rehabilitation to this specialized center for rehabilitation training.

Ambulation Ability.—At the time of admission, 22 of the patients, or two-thirds of the group, were incapable of any form of ambulation. Twelve of these patients were wheelchair-bound and 10 were bed patients. One patient had been bed-bound for nine years, another for five years. Of the nine patients capable of some ambulation on admission, four were moderately proficient in this function but were in need of further training; these patients had braces upon admission. Three other patients had been fitted with braces but were not proficient in using them, and the remaining two were classified as poor in their ability to walk.

Elevation Ability.—In the more difficult task of elevation, 23 were totally unable to make any step involving the lifting of the body from one level to another in the standing position. Eight of those patients who had some skill in ambulation also showed some skill in elevation; the degree of this skill was usually in proportion to their ambulation skill.

Self-care.—In activities of self-care, i. e., bathing, dressing, moving from bed to chair, 10 patients were totally incapable of self-care (except in self-feeding). Eleven were inadequate, while the remaining 10 were classified as fair or good in their self-care activities. As might be expected, those who were capable of limited ambulation were also better able to provide for their personal needs in toilet care, bathing, and dressing.

Bowel and Bladder Regulation.—Bowel and bladder regulation in varying degrees presented a problem to all of these patients at time of admission.

Appliances.—While braces had been previously prescribed for a few patients, the majority (26) were in need of bracing or rebracing.

Educational Background.—The average level of educational attainment for the group was ninth grade. Two of the younger patients, a young man and a young woman, had had some college training, while at the other end of the scale were two older men who had had no formal education. Eight in the group had completed high school training; 4 had had some high school training; while 12 had had only elementary schooling. Education information for three of the group was not available.

Vocational Background and Consequences of Disability.—Fifteen of the patients had been employed before injury as laborers in local industries, such as

textiles and wood, or in farming; four of these had been truck drivers serving local industries. Ten of the group had held clerical, skilled, semiskilled, or sales jobs; six younger patients had had no work experience prior to becoming disabled. Information about income prior to the onset of disability was not available in every case. However, among the patients who were employed at the time of injury, the range of income was from $80 in one case to marginal earnings of $20 to $25 per week in several, with an estimated average of $35 to $40 per week.

As a consequence of disability, the work lives of these patients had come to a virtual standstill. Five had been able to carry on limited work in radio, electrical appliance, or watch repair from their homes. One patient had been able to obtain regular employment suited to his capacities (county treasurer) and another to start a small business of his own (operating a wood and coal business). Only one patient was receiving a regular salary from an employer. Seventeen patients previously gainfully employed were being supported at the time of their referral by earnings of family members or by public funds.

Psychosocial Status.—Twenty-nine of the patients in the study group lived in small detached homes, which in their own estimations were suitable to their needs. Eight of the group either owned their own homes or lived with their parents in family-owned homes. Twelve patients had been living with spouses and families prior to admission; 11 patients lived with both parents, 5 with the mother only, one with the father alone, and one with a brother. Information was lacking in one case.

As might be expected among a group of severely disabled patients such as these, there were many profound psychosocial problems—the consequence of years of hospitalization, dependence, inactivity, and frustration imposed by disability. One female patient had become addicted to meperidine (Demerol) hydrochloride; others had lost hope of ever walking again or of being able to live independently. Some had ceased to rebel against their enforced dependence and obtained security and satisfaction from close ties to their families.

Course During Rehabilitation

Each of the patients, upon arrival at the institute, was examined thoroughly by a team of specialists. His medical, orthopedic, urologic, neurological, and physical rehabilitation status was assessed, and psychosocial and vocational potentials were evaluated. Rehabilitation goals were then tentatively projected, in terms of training in bed and wheelchair activities, ambulation, elevation, bowel and bladder care and other spheres of self-care, and an appropriate treatment program outlined. The latter consisted of physical therapy, occupational therapy, remedial exercise, training in activities of daily living, prevocational exploration, and psychosocial assistance, as individually indicated.

Self-care and Mobility.—In the course of training there was marked improvement in self-care activities among all of the patients. Improvement was universal in bed and wheelchair activities. Even those patients who had been bed-bound for years were able to learn to move from bed to chair independently and to perform dressing and bathing functions in which they had previously needed much assistance. Those patients who improved most in ambulation and elevation similarly made greater progress in areas of self-help, but for the whole group the concept of independence through wheelchair self-sufficiency was the core of the training program. All of the patients except one were equipped with wheelchairs prescribed to their specific needs; the remaining patient no longer required a chair after his rehabilitation treatment.

One facet of the self-care program that contributed to the independence and mobility of the patient was the training given for automobile travel. By the time of discharge, 24 patients were taught to get in and out of a car unassisted, and 6 of these learned to operate a car with hand controls.

During their rehabilitation training, 27 of the 31 patients accomplished some degree of proficiency in walking with braces and crutches and mastered some skill in elevation. Of the four who did not achieve independent ambulation status, one was a female who preferred to concentrate on wheelchair self-sufficiency and refused ambulation training. One male, an older patient, refused surgery to release the contractures that prevented adequate bracing for walking. Weakness of upper extremities limited the progress of one young female patient and, similarly, made ambulation totally impossible for a quadriplegic youth. Bracing in general consisted of double long-leg braces and pelvic bands, with additions of spinal cage supports depending upon the level of the spinal cord injury.

Bowel and Bladder Training.—Bowel and bladder training was attempted in all cases. Nine of the patients were able to attain automatic bladder control; 20 patients preferred to use a urinal despite increased bladder control. All 31 of the patients were able to markedly improve the function of both bowel and bladder control.

Psychosocial and Vocational Care.—The distance of the institute from homes and accustomed environments served as a stimulus to achievement to most of the group, while for a few the sense of insecurity brought about by separation from close family ties tended to heighten already existing anxiety and depression. Psychosocial problems were handled by the psychiatrists, psychologists, and psychiatric social workers of the psychosocial division, working in cooperation with the physicians, nurses, and therapists of the staff.

In scheduled interviews the patient was provided with the opportunity to discuss the rehabilitation program, his reaction to it, his feelings about his disability, and his plans for the future. The social worker and vocational counselor, working together and in cooperation with the Division of Vocational Rehabilitation in the patient's home state, assisted in outlining plans for future social and vocational adjustment.

In a small number of cases (four) psychosocial problems subjectively described by the patient as "homesickness" resulted in termination of the treat-

ment before maximum benefits had been achieved. Even with these patients, substantial gains were made during their period of training, although their average stay was only one-half as long as that of the total group.

Occupational therapy was prescribed in most instances for prevocational purposes, the occupational therapist and vocational counselor working together in evaluating the vocational aptitude of each patient. The recreational program, both inside and outside the hospital, provided social and recreational relaxation to balance the arduous work of physical rehabilitation.

Complicating Problems.—In the course of their rehabilitation, 20 of the 31 patients required medical or surgical procedures necessitating transfer from the rehabilitation institute to the University Hospital of the New York University–Bellevue Medical Center. In some instances this additional medical or surgical care had to be carried out before definitive rehabilitation procedures could be instituted; in other cases the training program was interrupted and later resumed after hospital treatment.

Nineteen patients required genitourinary study, transurethral resection, or other treatment for urinary problems complicating the spinal cord injury. Laminectomy was carried out in three cases, in two for the first time and in one in which the patient had had previous laminectomy. Cordotomy, cordectomy, alcohol injection, and alcohol block were performed for relief of pain or spasticity in four cases. Decubitus ulcers were repaired by plastic surgery in six cases. Orthopedic surgery was performed for relief of adductor muscle spasm or tight Achilles tendons in three cases.

Length of Training Period.—The average total stay for the entire group of 31 patients was 138 days, or about four and one-half months, with a range of 37 to 365 days. Excluding the time spent in University Hospital for treatment of complications, the over-all average length of stay at the institute for rehabilitation training was 104 days.

Among the 20 patients who required definitive treatment for complications, an average of 54 days was spent at University Hospital for the care of these complications. In addition, these patients spent an average of 116 days in rehabilitation training at the institute, as compared with the average of 82 days for those 11 patients who did not require treatment of complications during the training period.

Cost of Training Program

The expense of sending this group of patients to the Institute of Physical Medicine and Rehabilitation at the New York University–Bellevue Medical Center was assumed by the referring agency, the Division of Vocational Rehabilitation of the Georgia State Department of Education, and the cost, therefore, had been computed here from figures submitted by this agency. Cost figures for hospital care include not only daily charges for bed and nursing care but also operating room fees, x-rays, laboratory, and other technical fees, and fees for consultants.

While the average cost of care (table 1) of each patient in the total group was $3,518.86, the average total cost of those patients requiring treatment of complications was $4,467.28, as compared to a cost of $1,794.46 for those patients requiring only rehabilitation training.

In totaling all expenses incurred in sending these 31 patients from their homes in Georgia to the institute in New York City, and in returning them to their own communities, there must be added the costs of transportation, of incidental expenses (such as for personal needs and travel attendant), and of necessary mechanical appliances. The latter entailed an additional expenditure of $18,850.28, making the over-all total cost of $127,935 or an average total cost of $4,127 per patient. For those patients whose conditions permitted immediate and uninterrupted physical rehabilitation (i. e., the group of 11 patients who did not require hospitalization for treatment of complications), the average total cost per patient was $2,318, while for those requiring additional medical or surgical treatment the average total cost was $5,112.

Follow-up Study

Since the value of both physical and vocational rehabilitation must be measured in terms of sustained effectiveness, it was considered imperative in a study of this sort to supplement the preceding data with a follow-up evaluation of patients subsequent to their return home. Accordingly, the collection of pertinent follow-up data was undertaken. The follow-up for each patient was made after a minimum of one year after return home. This information was obtained through use of a seven-page questionnaire. Each patient was visited by a staff counselor of the Division of Vocational Rehabilitation of Georgia, and replies to the questionnaire were elicited from the patient through direct interview; these data were recorded by the counselor and then submitted to us.

TABLE 1.—*Cost of Hospital Rehabilitation Care*

Groups	Medical & Surgical Costs, $	Physical Medicine & Rehabilitation Costs, $	Total Medical and Surgical and Rehabilitation Costs, $
Total			
Total 31 patients	...	...	109,084.72
Av. per patient	...	...	3,518.86
Requiring treatment of complications			
Total 20 patients	42,917.11	46,428.46	89,345.57
Av. per patient	2,145.85	2,321.47	4,467.28
No complications			
Total 11 patients	...	19,739.15	19,739.15
Av. per patient	...	1,794.46	1,794.46

The information obtained concerned many pertinent spheres: the need for further medical and hospital care subsequent to the training period; the status of the bowel, bladder, and skin; progression or regression in ambulation, elevation, and self-care status; the general physical condition; and the use of appliances and devices. In the psychosocial and vocational areas, the data collected related to employment, income, recreation, and housing; in addition, it included the patient's personal evaluation of the rehabilitation program and his estimate of its consequences immediately and subsequently in his total adjustment to his disability.

Physical Rehabilitation Status at Follow-up

Ambulation.—As noted in table 2, 22 of the 31 patients were incapable of ambulation at the time of admission, while 9 had varying degrees of skill in this. After rehabilitation training, 27 of the group had improved in ambulation, while 4 remained nonambulatory. At the time of follow-up, 3 of the 27 patients had regressed to wheelchair status. One of these found a wheelchair existence more suited to his work and life; a second had developed severe pain necessitating surgery and had ceased to ambulate; and the third, a divorced housewife, found application of braces too difficult in her solitary existence. Twenty-four of the patients have continued to be ambulatory.

Elevation.—Initially, 23 of the 31 patients were incapable of elevation, while the remaining 8 had poor, fair, or good skill in this activity. Of the 27 patients who developed skill in ambulation during their rehabilitation training, all of these similarly developed elevation skills; the 4 patients who remained nonambulatory were also incapable of elevation activities. At time of follow-up, six patients had regressed in ability to elevate, having found that a combination of ambulation and wheelchair activities or wheelchair activities alone were best suited to their abilities and needs in the home environment. Twenty-one of the patients had maintained or improved their ability to elevate.

Bed and Wheelchair Activities.—As previously noted, all patients during their period of rehabilitation training showed a marked improvement in bed and wheelchair self-sufficiency. At time of follow-up, these gains had been maintained in every instance, even when regression had occurred in other spheres. For independence, most patients depended upon proficiency in wheelchair activities, using ambulation for exercise and for necessary moving about; "walking" as such usually was not employed when activities could otherwise be accomplished from the wheelchair.

Use of Automobile for Travel.—Of the 24 patients in the group who had been trained to get in and out of an automobile, 3 at follow-up were no longer able to do so, but 6 others who had not accomplished this at time of discharge had subsequently learned this skill. Six patients had been taught during their rehabilitation to drive a car with hand controls; at time of follow-up these and three additional patients were so driving.

Bowel and Bladder Training.—Since the urinary tract is an area of acute concern in the health of the patient with spinal cord injury, evaluation of the urinary tract and bladder training were important aspects of the rehabilitation program. Nineteen of the study group had presented urinary problems during the training period requiring either urologic evaluation or surgical intervention. However, all patients during their rehabilitation were considered to have shown improvement in the handling of their bowel and bladder problem. Despite their training, however, in scheduled control of urination, most of the male patients at discharge preferred to wear a rubber urinal as additional protection.

At follow-up, 20 of the 31 patients were wearing rubber urinals during the day and 6 also at night. Twenty-four patients professed to be following the routines for bowel and bladder control that they had been taught at the institute, and 21 of these judged this to be successful to a high degree. While no patient considered bowel and bladder routines 100% successful, only one patient claimed that urinary incontinence was the cause of a poor vocational adjustment. One-third of the group were having a monthly urine check as advised, while the remaining two-thirds either waited for urinary problems to arise or sought medical checkup at less frequent intervals.

Incidence of Illness and Hospitalization Since Discharge from the Training Period

In the follow-up period since discharge to their homes, 18 of the 31 patients had required a total of 21 periods of further hospital care. Six admissions had been necessitated by problems of skin breakdown, nine by urinary problems, two by fractures, one for spinal surgery, and three by miscellaneous medical conditions (anemia, pneumonia, hemorrhoids).

Although 18 patients had developed some problem of skin breakdown since discharge, only 6 of these had required hospital care, the remainder having been able to handle the problem at home under medical supervision.

TABLE 2.—*Physical Rehabilitation Status at Follow-up*

Classification of Patient	On Admission	At Discharge	At Follow-up (After Minimum of 1 Yr.)
Bed-bound	10	0	0
Wheelchair-bound	12	4	7
Capable of ambulation	9	27	24
Capable of elevation	8	27	21
Vocational status			
Employed	7		13
In training	0		10

Other postdischarge problems common among the group were leg pain, muscle spasm, burning sensations, severe swelling, and contractures. Muscle spasm and burning sensations were noted by more than one-half of the group. Swelling, pain in the lower extremities, and contractures were complained of by some but were less common and tended to occur in combination with the other more frequent symptoms. However, every patient continued to have some problem, major or minor.

Social and Vocational Status at Follow-up

Environment and Housing.—All of the patients in the group had returned after their rehabilitation to the locality and to the home from which they had come. Thirteen of the patients had adapted their homes to their new lives by having ramps constructed at the entrances. Three other patients had had adequate toilet facilities installed for their own use, and several had had parallel bars set up or stair rails installed. Adjustments in bed height to facilitate movement from bed to wheelchair were frequently required. The semirural background common to the patient group in most instances provided convenient surroundings with easy access to the outdoors, as contrasted with the housing problems faced by the person with paraplegia living in an urban community.

Marital Status.—Changes in marital status within the group were few. One patient whose wife had inflicted his injury by gunshot had obtained a divorce and was living with his children and his parents at the time of follow-up. One young married woman had been divorced from her husband and was living alone.

Recreation.—Thirty of the 31 patients, in reply to the question on favorite recreations, reported that they went to movies and to church, visited friends, and attended sport events and similar functions. Mobility within their environment was further evidenced in several instances by participation in fishing, hunting, and wheelchair pool games. Card games, radio and television, reading, playing of musical instruments, and hobbies such as leathercraft, model building, and collecting stamps were the more sedentary recreational pursuits common to the group. More than half of the group were participating in recreation outside as well as inside their homes. Only one patient claimed to have no recreational outlet, and only one patient indicated a need for greater recreational outlets.

Vocational and Economic Status.—At follow-up 13 of the 31 patients (42%) had been gainfully employed for from 9 to 12 months. Ten others (32%) were in training for suitable work under the auspices of the Department of Vocational Rehabilitation, while eight (26%) remained dependent. Of the five Negro patients in the study group, one was employed, three were in training, and one was dependent.

Of the 13 employed patients, 12 were male and one was female; the average age was 32. The female patient was single, and, of the males, six were married, one was separated, and five were single. The educational level of this employed group was close to the ninth grade average of the total study group.

Of these 13 employed patients, 5 had returned to their former jobs. One patient who had been a mill laborer had learned watch repairing; an automobile mechanic had become a skilled jeweler and watch repairman. A girl 20 years of age, formerly a clerk, had become a receptionist and medical secretary. A laborer, salesman, and jack-of-all-trades had become a bookkeeper, while a shoe salesman had learned radio and television repair. A skilled tile worker had been helped to start a grocery store and lunchroom. Another patient, with a work history of poorly paid odd jobs, was earning a steady income in shoe repairing. The 13th patient, a farmer, had obtained a part-time job as county tax commissioner, in addition to his work as a poultry farmer. The average weekly income of these employed members of the group was $40, an amount commensurate with the estimated average wage for the total group prior to injury and onset of disability.

Among the 10 patients undergoing vocational training at time of follow-up, the average age was 24. Nine of these patients were males, of whom eight were single and one married. One patient was a single female. Included in this group were the younger patients who at the onset of their disabilities had had no work experience and who, therefore, required suitable specialized training. Areas of training were in shoe repair work, tailoring and altering, reweaving, watch repair, and, in one instance, in reading law preparatory to the taking of bar examinations.

Of the seven patients who had been referred for rehabilitation training within the first year after their injury, six were already at work and the seventh was in training at the time of follow-up. Of the group of five referred during the second year after injury, two were employed, two were in training, and one was dependent. In the two-to-five-year group, none was employed at time of follow-up, four were in training, and four were dependent. Among the remaining 10 patients who had been disabled for more than five years prior to referral for rehabilitation, 5 of these were gainfully employed, 2 others were in training, and 3 remained dependent.

In the remaining group of eight patients who at follow-up were found to be economically dependent, five were male and three were female and the average age was 29. Of the women, one remained separated from her husband, another was single, and the third had obtained a divorce after her return to her home. Three of the males were married, and two were single. Among the five males, one patient, the father of seven children with a disability of long standing, felt himself unable to work because of pain and had not returned to his old job even though this was open to him. A second male patient, handicapped by limited intellectual capacity, low educational attainment, a paucity of training and job placement opportunities in his home town, as well as by persistent pain and swelling, had given up efforts to train as a garage mechanic. A third, limited vocationally by his illiteracy, shared optimism with his vocational counselor that a job would eventually open up for him in local industry. Another patient, embittered and discouraged by persistent physical problems, had given up training in shoe repairing and had become financially dependent on welfare funds. The fifth male in the unemployed group was a 20-year-old boy, who considered himself "totally disabled." He had left the institute against medical advice, before completion of training, although it had been felt that with physical, psychological, and vocational therapy he could have achieved a measure of independence. Among the remaining three female patients unemployed at time of follow-up, all were patients who had presented problems of social and emotional adjustment during their training periods. Two of the three had sustained their injuries in conflict with suitors and the third, injured in a car accident in which her husband had been driving, had had marital difficulties and had subsequently been divorced.

Psychological Adjustment.—In their rating of personal adjustment to their disability (poor, average, good, or very good), only two patients considered their adjustment to be "poor." Both of these men, one a youth and the other a 40-year-old married man, were in the dependent group. Six patients considered their adjustment "average"; one of these was an employed male, two (one male and one female) were in training, and the remaining three were dependent. Ten patients claimed a "good" adjustment; of these four were employed males, four were males in training,

and two (a male and a female) were dependent, although both verbally desired employment. Thirteen patients felt that they had made a "very good" adjustment to their disabilities; eight of these were employed, four were in training, and one single woman was dependent.

Comment

The significance of the problem of spinal cord injury and paralysis has largely been identified with war injuries, because of publicity relating to advances in rehabilitation techniques developed during World War II for patients with these disabilities. It is not generally appreciated that while World War II produced 2,500 such casualties among our troops, 15,000 such disabilities occurred among our civilian population in the same period of time.[2] Since the close of the war, attention has become focused on this disability problem among civilians, and specialized centers for applying rehabilitation techniques have grown considerably in number and in quality.

Although it has been repeatedly demonstrated that the cost of rehabilitation treatment is economically a sound investment in terms of restored personal and financial independence, few studies have included adequate follow-up statistics to corroborate the immediate favorable results of such treatment. This study, therefore, was undertaken to evaluate both the immediate treatment results and the subsequent course of the patient after his discharge to the community.

In the evaluation of rehabilitation results among any group of severely disabled patients, it is essential that patients be unselected and that results of the treatment program be projected to include an adequate period of follow-up after discharge. In this study, both for uniformity in the collection of data and for uniformity in services provided patients, it was considered desirable that the patients under study be clients of a single sponsoring agency. Accordingly, the Department of Vocational Rehabilitation of Georgia was selected because of the relatively high number of referrals from this source and because of their generous offer to assist in the collection of follow-up data. The 31 patients in this study, therefore, comprise the total group of patients with spinal cord injury referred by the Georgia Department of Vocational Rehabilitation in the period of December, 1950, to March, 1953, an arbitrary period permitting a minimum follow-up period of one year for all cases.

The core of the physical rehabilitation objective for the patient with spinal cord injury is independence. This includes not only independence in personal self-care but also independence in mobility with or without necessary bracing, crutch, wheelchair, or other appliances. It is significant that all of the 31 patients, including the 10 who had been bed-bound, could be trained in some measure of such independence and that 27 attained some proficiency in the more advanced techniques of ambulation and elevation. That these were functional accomplishments and not mere feats was apparent in the follow-up statistics, which showed that in general these gains in self-care and mobility had been maintained.

Although the great majority (27 of the 31) of the patients mastered techniques of ambulation and elevation in the course of their rehabilitation, the follow-up study showed that most patients after their discharge depended upon their wheelchairs for self-sufficiency and independence and utilized the more difficult functions of erect ambulation and elevation in braces and crutches only for those necessary activities that could not be accomplished in a wheelchair. This is a consideration of importance, since perfection of ambulation and elevation in braces is time-consuming and expensive in terms of protracted training, whereas wheelchair self-sufficiency training is considerably less so. This fact has recently provoked negative opinions as to the practicality of training patients with spinal cord injuries in ambulation and elevation techniques.[3] However, proponents of such training point out the marked geographical constriction imposed upon patients dependent solely upon wheelchair mobility. We strongly endorse training in ambulation and elevation techniques for most paraplegic patients, so that these techniques may be used in those functional activities unattainable from a wheelchair. It is felt that the present follow-up study accentuates the wisdom of this, for, while most of the patients studied relied largely upon the wheelchair for independence, 24 of 27 had maintained their ambulation proficiency and 21 of 27 their ability to maneuver stairs, curbs, and other elevations thus retaining broad physical independence.

The predisposition of patients with spinal cord injuries to complications is a frequent deterrent to rehabilitation and often a grave danger to life. In previous years, before the discovery of antibiotics and chemotherapies and before the perfection of plastic surgical techniques and other modern medical specialties, these complications almost invariably proved fatal.[4] While these complications of spinal cord injury are now mostly amenable to treatment, the incidence of them remains high. In this study, because of the small number of patients, no definite relationship could be established between the incidence of complications and the lapse of time between injury and start of the rehabilitation treatment program. However, it is generally agreed that the deconditioning of bed rest predisposes to many of the complications incident to paralysis and that the earlier the start of a physical rehabilitation program the less the danger of these. Twenty of the 31 patients in this study presented urologic, neurological, plastic surgical, orthopedic, or other complicating problems requiring definite medical or surgical care. The significance of these complications is reflected in both the prolonged length of rehabilitation treatment time and in the increased cost. The patient developing a complication required an average of 54 days for the treatment of this complication, and in addition his physical rehabilitation program averaged 30 days longer than that of the patient developing no complications. While the total cost for the uncomplicated patient requiring only rehabilitation training was $1,794.46, that for the patient developing complications requiring medical or surgical care was

$4,467.28. The presence of complications, therefore, more than doubled the total cost of rehabilitation care.

As evidenced in the follow-up study, the threat of complications continued after the termination of the rehabilitation program. Aside from complications necessitating definitive hospitalization, all patients carried with them a residuum of physical complaints of major or minor significance. For the maintenance of gains attained in a rehabilitation treatment program, it would seem essential that the patient with spinal cord injury be constantly regarded in the light of complication threats and that he be followed carefully and continuously under medical supervision.

In the study of patients such as these referred for rehabilitation by a vocational rehabilitation agency, the success of a treatment program must be measured not only in terms of physical independence but also in terms of the patient's ability to return to gainful employment. In this group, after a minimum of one year, 42% had returned to gainful employment and an additional 32% at the time of this report were actively engaged in vocational training programs preliminary to gainful employment; 26% were unemployed and economically dependent. This is in marked contrast to the 22% who were employed and the 78% who were unemployed and economically dependent prior to initiation of rehabilitation. It is of significance, also, that the average income of those employed at time of follow-up approximated the estimated average wage of $40 per week among the group prior to onset of disability. Of special note in the group who were employed at the time of follow-up were five male patients who had been disabled and homebound for more than five years each prior to undertaking their rehabilitation program.

While there were a greater number of patients among the employed group who at follow-up felt that their psychological adjustment was "very good," this concept of adjustment on the part of the patient could not be directly correlated with vocational and economic attainment status. Similarly, favorable opinions of the rehabilitation program from the patients could not be correlated consistently with improvement in vocational status or even with improvement in general physical condition.

In the evaluation of results of a rehabilitation program such as the one for these 31 seriously handicapped patients, one must keep in mind the many intangibles that have been merely implied in this report. The gains in dignity and psychological health that go with every increase in adjustment have contributed to the enrichment of the patients' lives as well as the lives of the people in their immediate environment. Furthermore, the gross measure of adjustment on every level can be assessed only in terms of each patient's original potential, the ordinary cultural and economic levels of his community, and the severity of his original disability. Finally, rehabilitation is only partly completed when a patient finishes his treatment and training in a hospital and steps back into the world with his new-found skills of independence. His success or failure in making this transition from the protected to the unprotected environment to a great measure hangs in balance, dependent upon the energetic support, guidance, and resourcefulness of his vocational counselor. The high degree of success among the patients reported here, therefore, reflects not only the merits of modern physical rehabilitation techniques but also the great effectiveness of the Department of Vocational Rehabilitation of Georgia.

Finally, among these patients, the record of achievement, even in the face of severe and persistent physical odds, suggests that there is a quality in the rehabilitation program that transcends any of its parts in its value to the patient. Further study of the content and meaning of the interaction between the patient and the physician, therapist, nurse, counselor, social worker, psychologist, and even between one patient and another might yield valuable information toward a fuller understanding of the dynamics of the rehabilitation process as an aid not only in salvaging lives but in helping physically handicapped persons to live their lives with greater dignity and deeper satisfaction.

Summary

Thirty-one patients with traumatic transverse myelopathy were studied to evaluate both the immediate and the subsequent results of an intensive and total rehabilitation program. The follow-up in all instances was after a minimum period of one year.

Of the 31 patients, 27 were trained, in the course of their rehabilitation, in self-sufficiency in ambulation and elevation activities. At the time of follow-up, 24 patients continued to be proficient in ambulation and 21 in elevation activities. Medical and surgical complications of myelopathy presented frequent intercurrent problems both during and after the rehabilitation process. Further, the occurrence of such complications considerably increased the time necessary for rehabilitation and more than doubled the cost of such a treatment program. At the time of follow-up, 42% of the patients were employed full time in jobs and an additional 32% were in vocational training programs preparatory to employment. This was in marked contrast to the 78% who were unemployed and economically dependent at the initiation of rehabilitation training.

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Copies of the seven-page follow-up questionnaire are available from the authors on request.

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4. Footnotes 1 and 2.

THE SEXUAL DEVIANT (SEXUAL PSYCHOPATH)—CAUSES, TREATMENT, AND PREVENTION

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• *Hypotheses as to the etiological factors in certain stereotypes of sexual behavior are applied to three case histories. In one, a case of incest involving father and daughter, there was frigidity in the mother and a distorted background in the father; the complaints ultimately came from the mother. In the second, a case of compulsive grasping of women's breasts, the patient's family was found to have been extraordinarily inconsistent and confused as to physical intimacies. In the third, incorrigible exhibitionism necessitated institutional care of a man whose foster parents had been extremely inconsistent as to what was forbidden and what encouraged. The mere elucidation of etiological factors in such cases has not been found sufficient to effect a cure. Therapy has proved to be a formidable undertaking; it was futile in patients who showed no compelling motivation for treatment. The authors believe that hostile seduction by parental figures underlies all the sexual deviations. A first approach to prevention would therefore consist of education of the parents, and the incidence of sexual deviations can be reduced by relatively simple efforts on the part of pediatricians and family physicians.*

The sexual deviant poses a problem of tragedy to himself, distress to his family, and concern to society at large. Although sexual deviations are emotional disorders of individuals that require correction by a psychiatrist, the prevention of such disorders is largely at the command of the family physician and the pediatrician. The outlook for eradication or even significant curtailment of the incidence of sexual deviation is as gloomy to the psychiatrist operating unaided as is the prospect of treating individual patients with smallpox in the absence of prophylactic vaccination to a family physician. Actually, the family physician and the pediatrician, working in concert, can "vaccinate" large segments of the population against the "virus" of sexual deviation.

At the outset, it is essential that there be an end to the use of terms of hostile connotation toward the patient and to visions of the deviant as inhuman, predatory, incurable, and inevitably destined to pursue his present course. The older and too common terms of "psychopath" or "sexual psychopath" or "psychopathic personality with pathological sexuality" should give way to the more objective designations of "sexual deviant" or "sexual deviation," as recommended in Standard Nomenclature of Diseases and Operations. Under the term "sexual deviation" we include (1) any hostile, destructive sexual behavior manifested toward others (sexual sadism) or accepted from others (sexual masochism) of the opposite or of the same sex, and (2) all such unacceptable forms of overt sexual behavior as exhibitionism, voyeurism, fetishism, transvestism, homosexuality, and bestiality.

Considerable variability characterizes the degree of hostility and destructiveness toward others or toward the self. Furthermore, attributes incorporated into the total personality of the sexual deviant vary tremendously from patient to patient. Some have a well-developed conscience in all other areas of social behavior, while others may possess multiple conscience defects and display such additional antisocial activity as lying, stealing, fire-setting, and vandalism. No consistent personality pattern is exhibited. The concept of a uniform constitutional inability to establish warm, meaningful human relationships or to learn by experience is by no means universally applicable. Such personality defects may certainly accompany hostile sexual behavior or perversion, but they are not at all specific for this group of patients. Such traits often occur in many neuroses and psychoses and in instances of delinquency.

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Development of Current Concepts

Fortunately, in recent years, a better understanding of such sexually deviant behavior as the foregoing has removed the stultifying shackles of old theories of genesis, based upon constitutional defects, which promised little for therapy or prevention. The early work of Freud [1] and Ferenczi [2] emphasized abnormal but modifiable psychological development in contrast to inborn and intractable drives. Subsequently, much serious research has been pursued by many physicians to achieve a better understanding of the pathogenesis of these conditions. Only an increased comprehension of the causation of the disorders can provide a guide to intelligent treatment, help for the patient, and the protection of society. More important, an appreciation of causal factors fosters alertness to incipient manifestations of trouble ahead and suggests measures for prevention, which must be the primary concern of the psychiatrist, the pediatrician, and the family physician.

The research on causes of "individual delinquency" carried out during the past 15 years by Szurek and one of us [3] suggested a new approach to the problem of the sexual deviant. By means of intensive treatment of parents of the non-gang-member delinquent child, we demonstrated that repeated stealing, arson, and vandalism are stimulated by unconscious or rarely conscious antisocial impulses in the parents. The parents derive unconscious but real gratification from the

enactment by the child or adolescent of impulses socially forbidden the parent. In very large numbers of the cases studied of serious conscience deficiencies in children of "good families," parental fostering of the antisocial behavior was discovered in every instance in which an adequate search was possible or was permitted.

Parallels between delinquencies related to property or truth and delinquencies pertaining to sex were displayed in the early investigations of Szurek and one of us.[3b] Extensions of findings linking parental fostering and sexual deviations were presented by Kolb and one of us [4] and were still further elaborated by Litin and co-workers.[5]

Parental Seduction

To understand the pathogenesis of antisocial pathological sexuality, the physician must face a disquieting but demonstrable fact: examples of all degrees of parental seduction of the child occur more commonly than it is comfortable to contemplate, regardless of the socioeconomic status of the family. The seduction may be as subtle as a caress or as blatant as actual incest. Seduction in any degree is the pathological sensual tempting and sexual stimulation of the developing child—the future sexual deviant.

Rather generally, people, including physicians, reared as they are in our culture of healthy taboos, are likely to react initially with anger and repulsion to accounts of seduction, especially the more obvious forms. Increased understanding of the backgrounds of these patients and of their parents tempers the natural emotional response, which gives way to sympathetic but grave medical concern.

The simplest unwitting seductions occurring in a family often reflect confused parental efforts to be "modern" and hide nothing from the child. The conventional restraints of common modesty respected outside the home are ignored when the children are concerned. The parents parade about the house in all degrees of nudity, sleep with the child, bathe with the child, and respect no bathroom privacy. The child's normal but tentative efforts at privacy are disregarded. The behavior may extend to such more frankly seductive practices as playing with the child's genitals or permitting an intimate physical examination of the parent. Initial reluctance by the puzzled child gives way to compliance in the climate of permissiveness, and the parent and child stimulate each other.

In such families, no consistent attitude toward conversation about sex is displayed. A vague sense of guilt may rigidly proscribe all mention of sex, or "freedom from prudery" may foster excessive discussion of sex, providing unconscious gratifications to parent and child, with supercharged, unhealthy but exciting tension.

The pathological aspects lie less in the overt behavior of the parent than in the age of the child involved. In infancy, nudity, bathing, inspection, fondling, sleeping together, and virtual absence of privacy are appropriate and even necessary. The entire coloring of these phenomena changes as the infant becomes a young child. Persistence of such distortions of kindly parental affection into adolescence is frankly pathological, destructive to the child, and dangerous to the parent and to society.

Under the guise of "motherly" or "fatherly" affection, boys and girls may be bathed by parents, often of the opposite sex, until adolescence. Children sense at bathing whether a mother's close inspection of the genitals is an honest, brief, physical necessity or an anxious, seductive maneuver. The bathroom may be as devoid of privacy as a railroad station. Habitual undressing, with startling abandon, occurs before the eyes of children. Sleeping with children of the opposite sex is prolonged into the teen-age period. The mother may still continue to lie with the son, despite awareness that erections occur. Study reveals that such mothers achieve from these experiences a gratification admixed with hostility and anxiety.

Stimulated by this parental behavior, the child finds no outlet for his aroused sensual impulses. Eventually, mounting frustration and anger force him to follow one of two courses. One is regression to the relative safety of more infantile attitudes and behavior patterns. Such a retreat quiets the immediate conflict. The other is physical aggression toward women. Unfortunately, neither course resolves the rage nor dissipates the overstimulated unconscious sexual drives.

Transgressions beyond the legitimate parental embrace of affection and into the sphere of frank bodily petting and intimate palpations of adolescent children by fathers or mothers are much less uncommon than is suspected by the average person. Often these seductive maneuvers of varying degrees of intensity by one parent are condoned by the other parent. Our patients have included members of families of all economic and social levels who have engaged in frank incest or its close approximation with the sanction of the second parent.

It is incumbent upon the scientific investigator to distinguish clearly, especially in his own mind, between observation and speculation, between objective phenomena and subjective hypothesis, and between an event recorded and a theory propounded. The observations set forth in this section on parental seduction are neither speculation, hypothesis, nor theory. They are events that occur, not uncommonly, and they are events to be observed and recorded, if the observer possesses an open mind and the knowledge, persistence, patience, skill, and experience to uncover these stubbornly elusive facts.

Parental Fostering by Equivocation

Antisocial behavior of almost any kind may be fostered by vacillation, ambiguity, equivocation, or "double talk" on the part of parents, such as the following examples show: "Fire-setting is prohibited, but, if you must light a fire, let us burn papers in the sink." "You must not steal, but, if you do take money, take it from my purse instead of the neighbors'." "Do not lie," but a half-hour later the parent will say, "Perhaps we should tell teacher you were sick that day we went riding."

A spurious admonition to right behavior, prompted by a fragile parental conscience, is rendered futile by the permissive, "but if you must. . . ." [6] Such ambiguities occurring in individual delinquency have been reported extensively elsewhere.

These techniques are also employed in the fostering of behavior oriented toward sexual deviations. A request to "sonny" to wear his bathrobe becomes ineffective when coupled with mother's "cute" reference to the charms of the boy's nudity. Orders to "stay out of the bathroom until dad has finished" are more appropriate in a family than open doors.

A transvestite boy of 14 years of age, at the age of 5 had been found smelling assorted laundry items belonging to his mother. Instead of an unequivocal prohibition, the mother urged only that the boy substitute her clean underclothing.

Children sense the anxious, vacillating permission and seduction in such parental double talk. Another manifestation of double talk is the parentally expressed concern for imagined future misdeeds by the child—the imagination deriving from the parent's mind but taking root in that of the child. There may be dire warnings of future sexual misconduct quite foreign to the child's conscious inclinations. A consciously guileless adolescent who is subjected to suspicious, suggestive, unfriendly quizzing angrily apprehends the destructive lack of faith on the part of the parent. The child senses that he is expected to misbehave sexually. The parents' fantasy that their small child will probably get into sexual trouble during adolescence provides a compelling guide. Unconsciously, the parents gradually maneuver this child into adolescent sexual acting-out.

Concept of Pathogenesis

Our investigations testify to the origin of sexual deviations in pathological permissions or even coercions of the child by adults within the family. Direct, hostile sexual misbehavior usually derives from conscious overt parental fostering, while perverse sexual aberrations result from unconscious or, more rarely, conscious stimulation by a parent. In either case, it is clear that parents who so distort their child's psychosexual development are emotionally very confused, badly maladjusted, and definitely sick, belying every outward appearance of their stability in the community. All such parents reveal an unsatisfactory marital sexual relationship.

Establishment of a cause-effect relationship demands that parental pathological permission or coercion (a causal factor) be always present when the child displays deviant sexual behavior (the effect). Also, it is required that such parental sexual sanctions always be absent in a control series in which children do not display the sexual deviations and perversions under consideration. These cause-effect relationships have always emerged from the intensive studies by Mayo Clinic research workers in parents and children with sexual abnormalities and in the control group displaying many nonsexual emotional disorders. So constant are these findings that perhaps we may be warranted in the tentative judgment that alternate concepts of the pathogenesis of sexual deviations held by other competent psychiatrists are derived either from unfamiliarity with the concept described herein or from failure to search sufficiently, diligently, and intensively for the casual relationships described.

Direct Hostile Sexual Acting-out.—When the parents consciously foster and sanction deviant sexual behavior in children and adolescents, what happens is plain enough. Adolescents who are allowed to know that their parents indulge in illicit sexual affairs will angrily incorporate the defective parental standards and be guided accordingly, essentially in imitation. Family illegitimacies that are condoned and brought to the children's attention provide sanctions for illegitimacies by the children. Similarly, children's hearing and observing hostile sexual behavior between parents lead the children to identify with this parental fusion of viciousness and sexuality and later to behave in like manner themselves.

The mother may continue to sleep with an adolescent boy, despite awareness that he is experiencing erections. The mother may permit or encourage the fondling of her breasts by boys into the age of adolescence. Fathers may sleep with daughters and engage in all degrees of caressing and genital stimulation. Actual incest, particularly of the father-daughter variety, occurs far more commonly than we formerly knew. Such experiences provide the child with a sexual excitement, coupled with a baffling frustration that arouses an anger that is intense but often repressed for a time. This is the soil from which stem all degrees of promiscuity in girls. The counterpart, maternal seduction of the son, is the environmental heritage for sadistic, direct sexual acting-out by the boy, who will soon become the adolescent and later the man. When the parent compounds the injury by projecting all blame upon the child, as often occurs, the sense of guilt is overwhelming, the conflicting evidence of the senses is incomprehensible, and a flight into frank psychosis may be the alternative to sexual acting-out.

Case 1.—We recently studied an 11-year-old girl of a middle-class family whose mother had known for years that serious genital seduction was being carried out by the father. The mother, frigid and very disturbed, for a time had been glad to be relieved of sexual marital "obligations," but eventually her mobilized anger and jealousy demanded that something be done to correct the family situation. The father, himself the product of a distorted background, openly confessed his behavior with the daughter and agreed to a program of long intensive treatment for the child and both parents. Without long inpatient treatment, this child faced not only probable pregnancy as a result of her father's actions but the virtual certainty of promiscuity. A complication in this case, magnifying the therapeutic difficulty, was the almost complete absence of shame or guilt on the part of the child because of the apparent approval of the mother.

Whatever may be the obvious superficial stimuli to seductive behavior provided by parents, there is also a hidden, usually unconscious, hostility toward the child and a compelling motivation concealed even to the parent, to destroy the developing personality. It is essential for the physician to appreciate that these parents behave in this manner because of emotional traumas administered by their own parents. Such parents are in as pressing need of treatment as are the

children. Too commonly, the uninitiated physician becomes so angry at the parents that he may encounter difficulty in treating them. Awareness and understanding of the experiences suffered by these parents in their past enable the psychiatrist to treat the parents objectively and sympathetically.

CASE 2.—Another instance of direct sexual acting-out was that exhibited by a 19-year-old man arrested for grasping women's breasts. Here, again, conscious fostering predominated in the confused family. The father of the patient frankly fondled the mother's breasts in the presence of the children. Noisy, sadistic sexual altercations between the parents were common. For three years, the young boy knew of his mother's sexual escapades with a lover in the family living room while the father was at work at night. The son was permitted to touch his mother's breasts until he was 12 years of age.

At that age, to the utter incomprehension of the boy and to his further undoing, he was shouldered with blame. "The touching of the mother's breasts must stop." Told that he was a "sex maniac," he was warned that "boys like you go around attacking women when you grow up." The mother told us of her apprehensions from when he was 7 years of age that the boy was "oversexed" and would be "one of those sex fiends." The unfolding story, freely but tearfully recounted, leaves almost nothing to the imagination in the sequence of fostering by overt example, permissive sanctioning of imitative behavior, and the devastating picture of the boy portrayed by the mother's hostile anticipation.

This was no "other-side-of-the-tracks" narration; it was no family of dubious reputation and whispered rumor. This family was an asset to the community, a strength in the church, and an example of industry, stability, and friendliness.

Perverse Sexual Aberrations.—In contrast to the instances of direct hostile sexual acting-out, stemming from conscious parental behavior, the perversions, such as exhibitionism, voyeurism, and transvestism, are traceable more often to unconscious parental sources. These unconscious aberrant sexual impulses of the parents, distorting the instinctual sexual development of the child, may easily defy detection. The origin and nature of the forces operating in the perversions differ significantly from the factors responsible for direct sexual acting-out.

In the adolescent—later the adult—searching taking of the history always reveals the following contributing factors: First, the child develops in a climate of confusion and frustration resulting from a poorly integrated marriage of parents who never even approximate a mature or gratifying marital relationship.

Second, one parent unduly stimulates the child, usually unconsciously, but occasionally consciously, by behavior of a sexual coloration; such as kisses or embraces just a measure too lingering or too intimate, lying on the same bed with the child, displays of nudity, and performance of bathroom functions quite unhampered by the amenities of privacy. Usually, the second parent condones the seductive stimulations.

Third, and critically different from the etiological sequence in direct, hostile sexual acting-out, the stimulation, however sexually charged, is aborted short of genital or even breast contact between parent and child. Consequently, the relationship is particularly heavily burdened with genital frustration.

Fourth, the parent deftly deflects the child toward unusual sexual behavior of a distinctly immature nature, carrying no uncomfortable threat to the parent with a limited commitment to seduction. Unconscious capital is made of such normal physical and sensual childhood expressions as peeping, which becomes voyeurism, "showing off," which becomes exhibitionism, and bisexual play, which becomes transvestism or homosexuality.

At an early age (about 2½ or 3 years), when a little child is emotionally rather bisexual, it is very easy to foster a boy's turning to girl's play and dress. Litin, Giffin, and one of us (A. M. J.) [5] have described in detail a case in which a mother, with the father condoning it, instilled transvestism in her 5-year-old son. This masculine woman had been seduced by her father and subconsciously hated men, including her son. She was excessively sexually stimulating to her little boy, short of genital contacts, and maneuvered him into completely feminine behavior. The child was not brought for psychiatric treatment by the parents, to whom the behavior was entirely acceptable, but he was referred by the pediatrician, who detected the unusual behavior in the course of an examination for a hearing difficulty. We have encountered numerous instances of the early stages of a mother's guiding a boy toward fetishism.

If a mother unduly shows off her body to her male child and inadvertently but obviously reveals enjoyment of the child's displaying his own body, the normal but limited exhibitionism of a little child may gradually increase to an abnormal extent. Thus, overly stimulated by a seductive mother who frustrates any genital contact, the child observes that his parents permit and encourage him in exhibitionistic behavior. The mother is stimulated by this increasing display. Since his actions are at least partially condoned by and are acceptable to the parents, the child carries out the acts with very little guilt or shame.

Yet, it has become abundantly clear to us that the child harbors a great anger, arising from the contradiction of an initial sexual stimulation culminating only in a subsequent genital taboo. All exhibitionists we have observed are consciously or unconsciously very angry at women. We have seen many instances of this same parental background in exhibitionistic adolescents, and, in every instance in which we have had the opportunity to study the parents as intensively as the child, we observed the same interplay of parent-child forces in operation. In all male sexual deviants involved with perversion, we always seek and invariably find (1) the sources of hostility toward a woman and (2) the stimuli for the specific sexual behavior evolved. The following typical case vividly depicts the tragic train of events responsible for an adult male's exhibitionism.

CASE 3.—A 36-year-old married man was committed to a state hospital for the mentally ill because he had repeatedly exhibited his genitals to women in his home community. Warned by the police in his home town, he was subsequently apprehended in a neighboring town for the same offense. On the day he was admitted to the hospital, a 45-minute interview conducted by an experienced psychiatrist elicited the following revealing information from the patient.

One and a half years earlier, this patient first had the urge to exhibit his genitals to women and had since carried out the impulse at irregular intervals. He said that, preceding the ex-

hibition, he felt "weak all over" and was aware that the impending act was wrong, but he was irresistibly driven to expose himself. When he exposed his genitals he placed his hand on his penis and experienced both an erection and orgasm. He vigorously denied fantasies of intercourse or of aggressive sexual activity at the time of the exposure. Devices, such as saying the rosary when the impulse toward exhibitionism gripped him or having more frequent intercourse with his wife, were of no avail. Authoritarian warnings from the local police were ineffective. The patient was quite aware that his uncontrollable impulse was destroying his life.

At birth this patient had been abandoned by his parents. For the first nine years, he was reared in a state orphanage. During this time he rarely had social contacts with the girls at the orphanage, since rather strict segregation of the sexes was enforced. No cruelty or seduction was directed toward him by any of the employees at the orphanage.

At the age of nine years, the patient was adopted by a farming couple who had two children of their own, a boy and a girl. In this home the patient was permitted no manifestation of normal anger under threat that he would be returned to the orphanage. Verbal references to sex were strictly taboo; the patient never dared request information about sex. Characteristically, however, certain forms of sexually oriented behavior were not only exempt from taboo but even fostered and encouraged. The mother bathed the patient's back from the time he was nine years old until he was 30 years old. In those years, during this bathing experience, the patient often experienced erections, which he knew his foster mother observed.

When the patient was 30 years old, the foster mother, by that time a widow, became a cardiac invalid. She demanded that the patient take over her household duties as well as the total care of herself. Since there were personal needs to be met at night, the patient slept in the same room with the foster mother. The foster mother would permit none but the patient to bathe her ("to the waist only") and to administer to "sores" upon her body. During this entire time the patient dressed and undressed in front of the foster mother, quite aware of a degree of accompanying sexual excitement. Obvious erections were recurrently observed by the foster mother, who neither protested nor averted her gaze. At this point in the interview, the patient said, with some feeling, "She should have told me the first time to dress somewhere else."

Recollection of other episodes about which "she should have told me it was wrong" included an incident of peeping at an outdoor toilet that was being used by girls. When the patient was detected in this act, the foster mother merely exclaimed, "Oh, you boys!"

These years of inordinate seductive stimulation, coupled with genital sexual frustration, aroused in the patient a vast anger, a rage of enormous intensity. The emotional traumas delivered by the irregularities in the sexual sphere were multiplied by an admixed financial niggardliness of no mean proportions on the part of the foster parents. From 9 to 27 years of age, the patient worked on the farm with no compensation other than his room and board. When his foster father died, the patient, then 27 years old, became responsible for all the farm work, including care of the stock. He then began to receive a mere $100 monthly, in addition to his room and board. The final insult came when, after the patient had spent three years in caring for the foster mother under the circumstances described, she died, leaving a will completely excluding the patient from benefits. Instead, the foster mother bequeathed her farm and all other possessions to her natural son, who had never given her help and who had always derogated and criticized the patient. Consciously seething with rage at this monstrous injustice, the patient feared he was having a "nervous breakdown."

Let it not be thought that the foster parents of this patient were queer recluses who saved old newspapers on a run-down farm. They were successful farmers, respected members of the community, and altogether "nice people" in the eyes of their friends and acquaintances.

Ultimately, the patient left his former "home" and secured work that would provide appropriate pay. He saved money, fell in love, and married a young woman. In the marriage the patient encountered considerable difficulty from impotence, a scarcely surprising sequel to the antecedent psychosexual experiences. The young couple bought a farm and worked hard together to retire financial obligations.

When the wife became pregnant, the exhibitionistic symptoms began to assail the patient. At this time he was utterly unconscious of anger or hostility toward his wife. On the contrary, he insisted there had never been a difference of opinion between the two of them.

Etiological Determinants

This narration requires no technical or professional embellishment for definition of the nature of some of the factors responsible for the sexual deviation. The seductive stimulations, the appalling frustration, the parental fostering of exhibitionism, and the evolution of rage and hate are abundantly clear. Less clear to the uninitiated is the reason for the eruption of these forces into the overt practice of exhibitionism just at the time when the life circumstances and outlook of this patient "appeared" most favorable. At that time, for the first time emancipated, he could live independently, purchase his own farm, and make a home. Consciously, he was quite happily married. A baby was coming, and a good family was in prospect. What, then, was profoundly wrong?

Recall, in the life of this patient, the almost total absence of any compulsion to assume real responsibilities, until the death of the foster mother. The sheltered life of the patient while he was in the orphanage was followed by a protected—although otherwise harrowing—existence on the farm. As long as he remained passive and dependent, his basic material needs were met. The fact that he stayed on the farm in a setting of such submission identifies his basically passive-dependent character. Commonly, such a dependent person, seeking a mate, may search out a "mother-figure" upon whom he can continue to be dependent. This is the pattern of life that is familiar and comfortable. It is sufficient as long as it lasts. The anticipated arrival of the baby, however, posed a subconscious but definite threat to the patient's familiar, comfortable, sufficient existence. A rival newcomer might displace him from his position of dependency. Twice before he had been abandoned—at birth by his true mother and again by the death of his foster mother, who left him absolutely nothing from her estate.

As the pregnancy progressed and the imminent appearance of the rival approached, the patient's anxiety and resentment mounted. The subconscious fear of abandonment was coupled with a mobilizing of the rage born of his previous desertions and frustrations. Hostility toward women, usually unconscious, is an invariable ingredient of male exhibitionism. In its origins, the patient's rage was fused with sexual emotions, conditioned by the repeated seduction and frustration in his life with the foster mother. Exhibitionism was the specific accepted channel for the expression of the hostile-sexual urges that he had learned so very well from her through 24 long years.

We may well inquire how and why was it possible to obtain the illuminating, painful history of this patient in one relatively brief interview. Such an unfolding of the past, in our experience, by adult patients

with behavioral disorders of an antisocial nature commonly requires a rather long treatment period to engender the necessary complete trust in the therapist. In adolescents and children such accounts often are obtainable only in repeated, persistent simultaneous interviews with both parents and child.[7]

In the case under discussion, the vivid memory of the profound insult of disinheritance and its attendant fully conscious anger favored an early revelation of the past. But, however close to the surface this material lies, the conduct of the interview by the physician is the determining factor in bringing the truth to light. The psychiatrist and physician must be aware, by means of previous research, experience, or training, that the bare facts recounted proceed from an underlying pattern and that there is a high degree of specificity in the causal antecedents of sexual deviations. In this instance, the experienced psychiatrist knew what to seek and how to find it by indirect questions "flanking" the central episodes.

Therapy

Definitive psychiatric therapy of the overt sexual deviant is a prodigious task. The adolescent requires active and prolonged treatment by a skilled therapist. A few dynamic psychiatrists are becoming aware of the etiological aspects of sexual deviation and are gradually developing increasingly effective techniques in the treatment of both the child and parents.

In the light of our newer knowledge, we can interview parents and adolescents more intelligently. When the hidden sequences are uncovered in all their significance, the patients comprehend the origins and unfortunate rationale of their unusual behavior. A degree of understanding effectively penetrates the barrier between them and the therapist, and they may become ready and willing to enter into serious treatment. It must be repeated that treatment is an arduous, time-consuming process for the parents, adolescents, and therapists; consequently, it is very expensive. Treatment of a child or young adolescent while he or she is still living with untreated parents yields disappointing results. If the parents do not cooperate, it may be necessary to treat the child in a residential center removed from the parents. Unfortunately, such centers are far too few to meet the needs.

Treatment of the adult sexual deviant is indeed a formidable undertaking. A highly trained therapist is essential, and often the patient must be placed in a protected hospital environment for many months, especially early in treatment. Again, too few psychiatric facilities are available for adequate treatment of such patients. The problem is further complicated when there are a wife and children to support.

Therapy probably should never be commenced if there is no compelling motivation for treatment. Such instances are not uncommon, despite grave difficulties threatening dire consequences. Such sexual deviants are often devoid of guilt and conscious anxiety and seek only to avoid detection. This lack of guilt may be traced to the permissiveness of the parents during the early years of the formation of conscience. If adequate specific treatment is not available or if the patient cannot be motivated for treatment, the most charitable action for the patient and for society may be commitment to a state hospital for protective custody. Threats or punishments have been generally ineffective in compelling or helping the patient to control his or her pathological impulses.

Many of these patients have a very strong conscience in areas other than the sexual and are therefore dependable in most spheres of social behavior. However, without highly definitive and extensive therapy, it is never safe to predict that the patient will not indulge in a later repetition of his sexually deviant behavior. Individual psychiatric evaluation is necessary for assessment of the total personality structure and the future potentials of each patient.

It is entirely clear that the mere elucidation of etiological factors in the genesis of his sexual deviation and the subsequent intellectual discussion of them with the patient do not effect a cure. In the adult and in the adolescent, there are complex phenomenologic elaborations and extensions into the entire fabric of the personality, affecting all phases of interpersonal relationships. These complexities must be analyzed intensively and extensively; they are familiar to psychiatrists and psychoanalysts and are more appropriately discussed in other contexts.

Prevention

What we wish to stress in this paper is prevention by the family physician and pediatrician rather than treatment by the psychiatrist. The goal is prophylaxis, based upon an understanding of etiological aspects. When the psychiatrist encounters the sexual deviant as an adult, recognition of the etiological factors often requires long analysis. In the case of the child and adolescent, we readily observe the strategic pathological emphases at their inception. The sexual deviants constitute a social problem of a magnitude beyond the reach of the limited numbers of highly trained psychiatrists. Behavior physically dangerous to others and of major concern to the courts and to society is primarily to be anticipated from the group of openly hostile, sexually destructive deviants. The deviants, however, ordinarily displaying the less physically harmful perversions, such as exhibitionism or voyeurism, may unpredictably break through into more directly destructive sadistic action. Since hostile seduction by parental figures underlies all the sexual deviations and hate and anger are prominent, any deviant impelled by that hostility may become dangerous physically.

Although we know more today than formerly about the genesis of sexual deviation as it develops within the family setting, we are still woefully deficient in properly trained personnel and facilities for the treatment of these complicated conditions. It then becomes of paramount importance to embrace the strategy of prophylaxis and detection of early danger signs. This is the domain of the pediatrician and the family physician. It is these physicians who therefore must be alert to the multiple possible manifestations of all degrees of seduction and sexual stimulation within the family confines.

A first approach consists of education of the parents. Many well-intentioned parents, influenced by the misinterpretations of Freud's theories, do not observe proper and healthy rules of modesty in the home. Dangerously little knowledge has led them to believe that "neurosis is based on repression of sexual curiosity and interests," and, therefore, it is erroneously believed that an open approach to sexuality provides an emotionally healthful climate. The resulting multiple forms of bodily exposure may result in unwitting and excessive overstimulation of the child.

Second, pediatricians and family physicians must squarely face the unequivocal truth that all degrees of seduction and sexual stimulation occur all too commonly and in families which exhibit every outward aspect of respectability, decency, and conformity with convention.

There should be a few simple but pointed routine queries by the physician. Who sleeps with whom in the family? Which ones bathe together, and do they bathe themselves? What are the family habits regarding bathroom privacy? Are dressing and undressing communal functions? Is there a healthy degree of modesty in the home? What are the children's chief interests at play and habits in dress? Too often, such interrogation reveals unmistakable signs of an unhealthy atmosphere. When encountered, such tendencies should be met with an uncompromising counsel of prohibition.

If the parents are unhappily married and their hostile sexual impulses strain for an outlet, a physician's simple education of the parents, admonition to proper behavior, or direct prohibition of the seductive behavior may be of no avail. In such cases, combined psychiatric treatment of parents and child is indispensable. However, instances amenable to a forthright, relatively simple management are sufficiently numerous to warrant a rather general effort by pediatricians and family physicians. Such a program holds genuine promise for prophylaxis, for sparing many children a miserable life outlook, for strengthening the fiber of the public character, and for preserving society from an unhappy quota of hurt and violence.

Summary

Clinical research reveals that destructive direct sexual acting-out and perverse sexual behavior are forms of sexual deviation that develop, in most instances, from unconscious or, less frequently, conscious pathological fostering of deviant sexual behavior early in life within the family setting. Investigation further demonstrates that, engrafted upon this framework, direct and overt sexual seductive behavior inclines the child toward later direct, sexual, destructive acting-out, while indirect, disguised sexual stimulations engender the sexual perversions. Since therapy of the full-blown sexual deviant is long and difficult, prophylaxis is the preferred attack on the problem. Equipped with understanding and employing relatively simple procedures, the family physician and the pediatrician may well reduce significantly the incidence of sexual deviations.

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Anticoagulants.—The use of anticoagulants is of established value in pulmonary embolism, phlebitis, myocardial infarction, and embolization in rheumatic heart disease. It is of value in the prevention of thromboembolic complications after cerebral thrombosis. It is of probable value in the prevention of impending myocardial infarction. It is under experimental study in the treatment of acute cerebral thrombosis and in impending cases of this disorder. There have been improvements in heparin administration. New, effective oral anticoagulants are available. Vitamin K_1 is of value as an oral antidote. The use of trypsin given parenterally is not recommended. . . .

Anticoagulant therapy should be undertaken only by physicians who have mastered the technique. They must be willing to devote the time and effort needed to follow each case in minute detail. A reliable laboratory must be available. Only intelligent, cooperative patients should be given long-term therapy. The patient must be tested frequently. Antidotes must always be on hand. The physician cannot take a day off or a vacation unless he is covered by another physician equally skilled in the technique of this therapy.—W. T. Foley, M.D., and I. S. Wright, M.D., The Use of Anticoagulants: An Evaluation, *Medical Clinics of North America*, September, 1956.

CLINICAL NOTES

TRICHINOSIS INVOLVING THE CENTRAL NERVOUS SYSTEM

TREATMENT WITH CORTICOTROPIN (ACTH) AND CORTISONE

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Trichinosis is the most common parasitic infection in many parts of the United States. About 18% of the adult population is infected, according to the general incidence at autopsy.[1] This implies that the disease may very often be asymptomatic or that the clinical features of trichinosis are infrequently diagnosed. It is thought that the manifestations vary with the number of parasites present as well as with an unknown susceptibility of the host. The disease is generally considered self-limiting, although the mortality is said to be 6%.[2]

The most heavily infected areas are the diaphragm, intercostal muscles, and the muscles of the tongue, eyes, larynx, and neck. While any tissue of the body can probably be involved, the most serious complications are those involving the myocardium and central nervous system. The fact that the central nervous system could also be involved by the parasite has been known since 1906, when Frothingham [3] demonstrated the larvae in the brain. How frequently the central nervous system is invaded, and the degree of involvement, are difficult to estimate because of the protean manifestations that may be produced by the larvae. Evers [4] believes that the larvae are present in the spinal fluid in most cases of trichinosis but that their presence cannot be correlated with the signs and symptoms of central nervous system involvement.

When the central nervous system is clinically involved, such involvement appears to be of two types. In the first there are nonspecific nervous system manifestations, including headaches, neck pain and stiffness, apathy, confusion, and diminished to absent deep tendon reflexes. It is estimated that such features are common in trichinosis and occur in 10 to 17% of the cases.[5] Merritt and Rosenbaum,[6] in reviewing 110 cases of trichinosis at the Boston City Hospital, found deep tendon reflex changes in 10% of the cases. The prognosis in these nonspecific manifestations is good, and complete recovery is to be expected. The second type of involvement includes those cases in which there is specific focal cerebral damage. Cases in which focal damage is the dominant feature of trichinosis are infrequently reported. When Herd [7] reviewed the literature in 1953, he found only 31 cases of reported focal cerebral damage due to Trichinella spiralis. The mortality in these cases was 34%. It is likely that focal damage is more common than these few cases would indicate. When Sheldon [5a] studied 76 cases of trichinosis in the Wolverhampton epidemic, 13 of the patients were found to have focal cerebral damage. Central nervous system complications of trichinosis have been confused with meningitis, poliomyelitis, polyneuritis, collagen diseases, encephalitis, and psychoses, among other entities.

There is no specific therapy for trichinosis. In the past six years there have been scattered reports in the literature [8] describing the use of cortisone and corticotropin (ACTH) in the treatment of trichinosis. The following case represents an example of clearly defined focal cerebral damage due to trichinosis and suggests the reversibility of neurological signs and symptoms after combined steroid therapy. The rapidity of recovery prompts renewed speculation as to the toxic, allergic, and antigen-antibody concepts of trichinosis.

Report of a Case

A 43-year-old man was admitted to the Philadelphia General Hospital on the evening of April 23, 1956, in a confused, lethargic state. An adequate history was not obtainable at that time. It was, however, known that the patient, because of headache, weakness, malaise, and fever, had seen his family physician 10 days prior to admission. Because it had been thought that he had acute frontal sinusitis, he had been treated with daily injections of penicillin and given penicillin and sulfonamides by mouth. He failed to improve on this regimen, continued to have temperatures of 101 to 103 F (38.3 to 39.4 C), and complained of intense generalized weakness. Two days prior to admission, he became confused and disoriented. On the day of admission, he became semistuporous, and it was noted that he was unable to use his left hand.

Examination.—Physical examination, on admission, disclosed a well-developed male who was acutely ill. He was confused and incontinent. He exhibited an expressive aphasia. The blood pressure was 110/70 mm. Hg, pulse was 104 (regular), and respirations were 24 per minute. The temperature was 102.6 F (39.3 C) rectally. There were numerous splinter hemorrhages under all the finger nails, but there was no other evidence of petechiae or ecchymoses on the skin or mucous membranes. There was no lymphadenopathy. There was no tenderness over the maxillary or frontal sinuses. There was no periorbital edema. The pharynx was injected, but there was no exudate or false membrane. The ears were normal. The neck was freely movable, and there was no evidence of stiffness or rigidity. The heart was not enlarged. There was a normal sinus rhythm. No murmurs were audible. There were scattered, moist rales in both midlungs and bases. The liver and spleen were not palpable. There was no peripheral edema.

The neurological examination disclosed a definite wristdrop on the left. He was unable to abduct or adduct his fingers or oppose the thumb of the left hand. The flexor muscles of both the upper extremity and the left lower extremity were obviously weaker than the extensor muscles of these extremities. The

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weakness was estimated at 30%. There was normal response to pinprick and touch. The diameter of both pupils was 5 mm. They reacted slowly to light through a poor range. The disks and vessels were normal, and there was no evidence of papilledema. The cranial nerves were all intact. The cerebellar tests were poorly performed due to muscle weakness. There was no nystagmus. The deep tendon reflexes were active bilaterally but were greater on the left than the right. The plantar response was extensor bilaterally. The abdominal reflexes were absent. There were no meningeal signs. The diagnosis on admission was poliomyelitis.

A spinal puncture was performed after admission. The opening pressure was equivalent to 110 mm. H_2O. The fluid was crystal clear. Microscopic examination of the cerebrospinal fluid revealed no cells, and a smear showed no bacteria. The spinal fluid sugar level was 75 mg. per 100 cc. and the protein 19 mg. per 100 cc. Additional examination of the fluid showed no bacterial growth on cultures and a nonreactive Wassermann. The colloidal gold curve was 000000000. A chest film showed bilateral interstitial pneumonia. X-ray examination of the skull showed normal results.

Results of other laboratory studies made on admission were as follows: the hemoglobin level was 14.7 Gm. per 100 cc.; the white blood cell count was 15,500 per cubic millimeter, with 50% eosinophils, 38% neutrophils (22% band cells, 16% segmented cells), 10% lymphocytes, and 2% monocytes; and the blood sugar level was 83 mg. per 100 cc. and blood urea nitrogen 8 mg. per 100 cc. Urinalysis was normal. Stool examination was negative for ova and parasites.

History.—The next morning a detailed history was obtained from the family. The medical history was negative. On April 1, 1956, the patient had ingested raw pork which he had purchased, allowed to dry, and made into Italian sausage. From April 7 to 14, the patient had complained of malaise and weakness. He had aching pain in both thighs and in the left shoulder and developed intermittent diarrhea during this period. He complained of frontal headaches and neck pain. He was afebrile during the time and was able to continue working. On April 14, he was found to have a temperature of 102 F (38.9 C) and noted marked periorbital edema. The frontal headache was intense and the generalized weakness profound. It was at this time that the patient, suspecting this to be sinusitis, first consulted his physician. Penicillin therapy was started April 15. As previously stated, the patient failed to improve and developed the neurological symptoms already noted. He was admitted to the hospital 22 days after ingestion of the pork.

The diagnosis of trichinosis with focal cerebral injury was made within 12 hours after admission. The history of raw pork ingestion, the clinical course typical of trichinosis, the findings of splinter hemorrhages, interstitial pneumonia, left wristdrop, flexor muscle weakness in left arm and left leg, Babinski's sign bilaterally, incontinence, and aphasia, along with completely normal cerebrospinal fluid (no cells, normal protein level, and normal manometrics), and the marked eosinophilia made this diagnosis feasible.

On April 27, a biopsy specimen was taken from the left deltoid muscle. Microscopically, the specimen showed several foci of infiltration with polymorphonuclear leukocytes and proliferation of mesenchymal cells "resembling the reaction elicited by the trichinae." No parasites were observed. The pathological diagnosis was "probably trichinosis." A skin test with Trichinella antigen was negative on April 24. When the test was repeated May 14, there was a markedly positive reaction within 20 minutes.

Treatment.— Shortly after admission, the patient was started on therapy with 300 mg. of cortisone per day and given 80 units of repository corticotropin injection intramuscularly daily. This dosage was continued for three days and then reduced to 200 mg. of cortisone and 60 units of repository corticotropin injection daily for three additional days. The patient's condition was then maintained with prednisone, given in decreasing amounts for 10 days, after which all therapy was stopped. Steroid therapy was initiated about 48 hours after the onset of confusion, lethargy, and incontinence and 24 hours after the onset of the wristdrop and muscle weakness.

Course.—Within 24 hours after the start of the above therapy, the patient's temperature fell to 98.6 F (37 C), where it remained during his hospitalization. There was a dramatic improvement in his condition. He no longer appeared to be in toxic condition or acutely ill.

Mental clearing became evident 48 hours after treatment was initiated. The patient became more alert and was then expressive. He remained incontinent for seven days. Within eight days he had returned to his former mental status. He exhibited no residual changes in behavior or personality, and there was no memory defect.

Muscle strength improvement was first noted five days after treatment was started. The weak flexor muscles of the left extremities were obviously stronger at this time, after which improvement of the wristdrop was noted. The last muscles to regain strength were the intrinsic hand muscles. It was felt that all muscle strength was normal 13 days after admission. The extensor plantar responses became flexor responses after the ninth hospital day. The deep tendon reflexes were bilaterally equal and active at the same time. The abdominal reflexes could then also be elicited.

The interstitial pneumonia cleared, as seen clinically and by radiographic examination, after five days. The percentage of eosinophils decreased from 50 to 6 while the patient was on steroid therapy. Within one week after the cessation of steroid therapy, the percentage had risen to 47. During the next two months it gradually decreased and leveled at 23% (see table).

The patient was discharged 16 days after admission, on May 9, 1956. Neurological examination at the time of discharge showed completely negative results. Follow-up examinations were made at weekly intervals for five weeks after his discharge. His recovery was uncomplicated. His only complaint was tenderness in the left deltoid area (at the biopsy site). Muscle strength remained normal. There were no residual cerebral symptoms. The patient's condition was reevaluated two months after his discharge. He felt perfectly well and had resumed his duties as a policeman. Physical examination was normal. The eosinophilia persisted.

Results of Blood Studies in Patient with Trichinosis

Date, 1956	Hemoglobin, Gm./100 Cc.	Total Leukocytes/Cu. Mm.	Eosinophils, %	Neutrophils, %	Lymphocytes, %	Monocytes, %	Basophils, %
4/23	14.7	15,500	50	38	10	2	...
4/24	13.9	14,250	46	36	12	6	...
4/26	13.2	12,800	38	50	10	2	...
4/30	12.8	11,500	26	61	11	2	...
5/2	14.0	10,200	16	66	12	6	...
5/7	16.6	8,400	6	51	40	2	1
5/14	15.3	11,000	47	32	20	1	...
5/21	14.7	8,600	44	23	24	7	2
5/28	14.7	7,300	30	39	29	1	1
6/4	14.5	5,500	25	44	27	4	...
6/18	15.1	6,000	23	34	39	2	2
7/16	14.7	6,600	23	35	40	2	...

Comment

The clinical course of trichinosis involves three phases. The invasion phase is the period after the encysted larvae are liberated from the infected meat. They penetrate the duodenal wall, mature, and copulate. This period is of a few days' duration and may be characterized by the gastrointestinal complaints of diarrhea, nausea, anorexia, and vomiting, as well as sweating and weakness. The second phase (dissemination) usually begins within seven days. During this period, thousands of living larvae migrate throughout the body, having reached the systemic circulation through the lymphatics. During this phase, urticaria, periorbital edema, fever, splinter hemorrhages, muscle pain, profound weakness, and pneumonia, as well as myocardial and nervous system symptoms, appear. This phase lasts for three to six weeks, and it is during this time the acute aspects are

present. Gradual recovery is the rule. If death occurs, it generally follows a toxic course in the fifth or sixth week. The last phase is the period of encystment, wherein the larvae complete their cycle and encyst throughout the body, with a predilection for glycogen-poor striated muscle.

The mechanism by which the larvae produce the clinical pattern of trichinosis, including the neurological manifestations, remains uncertain, although various theories have been proposed. It is supposed by some [9] that the larvae migrate to end-arteries and capillaries, which they mechanically occlude or obstruct. This blockage then produces an inflammatory reaction, with resultant injury and destruction of the involved tissue. This theory would explain skeletal muscle, pulmonary, myocardial, and central nervous system damage on a mechanical basis. This concept arose from histological evidence from muscle and brain sections. Most and Abeles,[10] in describing the brain at autopsy in cases of involvement by the larvae, found three types of microscopic changes, described as (1) granulomatous lesions occurring as dense collections of lymphocytes, plasma cells, and a large cell with microglial elements in the form of a nodule, (2) these nodules containing the parasite, and (3) changes around blood vessels in the form of extensive perivascular infiltration. They found small hemorrhages but no gross hemorrhages. Hassin and Diamond,[11] in a pathological study of the brain in trichinosis encephalitis, found perivascular infiltration and endothelial proliferation. There was plugging with fibrinous thrombi and rupture of small blood vessels.

This concept of mechanical occlusion does not explain many of the signs and symptoms of trichinosis. There is much to suggest a toxin produced by the larvae or by the body's reaction to the larvae. The early manifestations of the disease resemble toxemia. Thus far, no toxin has been identified, and there is no evidence that such a toxin is produced.[2] During the migration of the larvae, the response appears to be allergic in character. Uticaria (which may be the initial sign), angioneurotic periorbital edema, eosinophilia, and splinter hemorrhages all speak for an allergic element in the disease.

Luongo and associates,[12] considering these toxic and allergic elements, used corticotropin in three cases of trichinosis and noted marked clinical improvement. However, in a study using corticotropin in guinea pigs with experimentally produced trichinosis, they were unable to demonstrate any anatomic differences in either the larvae or the reaction of the host. It was felt that the toxic effects on the animals were reduced with corticotropin, but that the mortality was unchanged with excessive administration of the larvae.

Davis and Most [13] obtained a series of muscle sections from a patient treated with corticotropin; they noted no effect as far as muscle invasion was concerned but found a reduction in the inflammatory reaction. Corticotropin was not larvicidal. They felt that corticotropin and cortisone had a beneficial but nonspecific effect which in some way modified the body's response to invasion.

Other than the toxic and allergic concepts of trichinosis, a factor that has been considered is that the early phases may represent an antibody-antigen reaction, directly or indirectly. Aikawa, Harrell, and Miller,[14] in studies with experimentally produced trichinosis in rabbits, found an increase in the permeability of the capillary walls and a redistribution of fluid in the extravascular spaces. They felt that the edema and urticaria are due to altered permeability of membranes and that excessive hydration of nerve cells may explain the psychic element. The rationale of using corticotropin is "to restore the physiologic integrity of membranes."

The reports on corticotropin and cortisone in trichinosis would indicate that striking improvement can be expected after their use. In the case herein reported, within 24 hours after steroid therapy, a patient obviously in toxic condition and acutely ill showed marked improvement. The neurological complications were definite and included muscle group weaknesses, pyramidal tract signs, aphasia, and altered reflexes. These cleared completely after the use of steroids. While it is known that many of the neurological signs are normally reversible, the severity of these signs would suggest a poor prognosis. The rapidity of disappearance of the neurological deficits would imply that the steroid effect is more likely related to the control of allergic, toxic, or antigen-antibody reactions than to the anti-inflammatory ability of the steroids. The prompt treatment with steroids would appear to be related to the reversibility of the neurological changes in this case. Such changes are often permanent. In this case no sequelae were demonstrated. It is felt that the dramatic clinical improvement after steroid therapy is in some way related to an antigen-antibody response and that use of steroid therapy early in the course of the disease is indicated.

Summary

Trichinosis commonly involves the central nervous system. Such involvement may produce either nonspecific neurological signs (headaches, neck stiffness, and decreased deep tendon reflexes) or actual focal cerebral damage, which may be of a protean type. In a case of focal cerebral damage due to Trichinella spiralis, a dramatic, prompt improvement was noted after treatment with corticotropin (ACTH) and cortisone. The patient recovered completely. Much of the clinical picture of trichinosis suggests an antigen-antibody reaction or toxic and allergic elements. The rapid recovery with reversal of focal neurological damage after steroid therapy may be related to these aspects.

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LUNG COLLAPSE IN AVIATION

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The problem of spontaneous pneumothorax is serious enough in normal occupations; in aviation it becomes more critical because of the victim's possible incapacitation and subsequent inability to control the aircraft. Also, the role of decreased barometric pressure in flight as an etiology of pneumothorax must be considered and evaluated for risk. Some high-level military and civil aviation policy based on the few cases available might well be in order as a guide for future cases.

Report of a Case

A 29-year-old pilot of a Navy F9F8 Cougar (high-performance jet aircraft), while his aircraft was being chased by another jet, performed a power dive from 30,000 to 10,000 ft. in an attempt to evade the chaser. Shortly after starting his pull-out and while under a stress of 6 G, which was maintained for about eight seconds, he experienced a rather sharp pain under his left scapula. (In aviation, in expressing the force of acceleration, G is one gravitational unit and equals 1 lb. of force divided by 1 lb. of mass of the pilot. Greater accelerations are expressed in multiples of G. Blackout occurs above 7 G in most pilots.) It was not too severe, and he thought perhaps he had "pulled a muscle" in turning around as far as he could to watch the pursuing plane. He went on into the field and made a normal landing.

The following day he played 18 holes of golf at a sea-level course with no difficulty. He then went up on another jet hop, but, when he reached 27,000 ft., he had a sensation as though he were going "to smother." He was using an oxygen mask at the time, and the plane's cabin was pressurized to only 15,000 ft. He returned to the base immediately without any further difficulty. That week end he went on a trip and played golf on two days. However, this time he noticed that he had more breathlessness than he usually experienced in walking around the course. The altitude of the golf course where he played is about 3,000 ft.

Two days later, and seven days after the dive mentioned above, he came to the station hospital complaining of "congestion" in his chest. He looked well. Physical examination revealed absence of breath sounds over the entire left lung field and hyperresonance to percussion. An x-ray of the chest showed a 90% collapse of the left lung (see figure). He was sent to the U. S. Naval Hospital, Yokosuka, Japan, where approximately 1,800 cc. of air was aspirated from the left pleural cavity. Further treatment consisted only of rest, and the patient's lung reexpanded totally in three weeks. The patient was discharged a month after admission.

His carrier was at sea when he returned to Atsugi, Japan, and he was kept grounded for one week. On the eighth day after his return to duty, he was permitted to fly a routine hop to 35,000 ft. (cabin pressure 20,000 ft.). This was accomplished without event. Two days later he went to 43,000 ft. for eight minutes and 45,000 ft. for three minutes, on pressure breathing, also without event. Shortly thereafter, he went to Southeast Asia and flew over 30 hours in the same type aircraft without any symptoms.

Comment

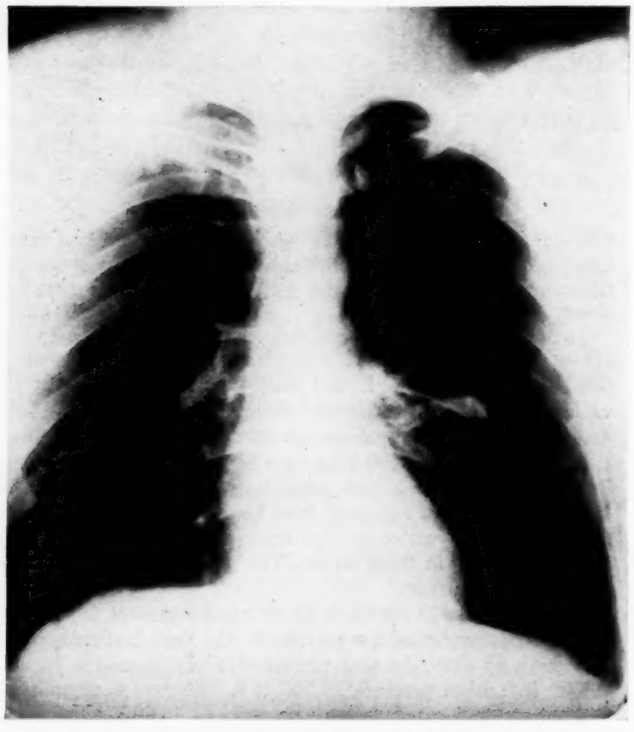
A review of recent literature reveals only two other cases of in-flight spontaneous pneumothorax,[1] neither one occurring in solo type or high-performance type of aircraft, and one case of spontaneous pneumothorax that occurred in a low-pressure (altitude-training) chamber. It is interesting to note that, in the case of a 21-year-old marine with a spontaneous pneumothorax, the following entry was made on the patient's health record: "Because of the condition in this marine, who is connected with aviation, it is advisable that this man never fly again because of the danger of recurrence during flight. He is transferred to the U. S. Naval Hospital for further treatment and disposition with the recommendation that, in due time, survey from the service be definitely considered."[2]

Flight Surgeon, Air Transport Squadron 23 (Lieutenant Markovits) and Flight Surgeon, Senior Medical Officer (Captain Phillips), Naval Air Station, Atsugi, Japan. Dr. Markovits is now at the Mendocino State Hospital, Talmage, Calif.

Read before the fourth Far East Air Forces Medical Conference, 6407th USAF Hospital, Tachikawa Air Force Base, Japan, May 7, 1956.

It is obvious that the case of the marine and our case of the Navy pilot were handled by vastly different methods. No doubt one reason was the extroverted, enthusiastic personality of the Navy pilot, which led to optimism on our part. Moreover, we were confronted with a man whose whole career and interest was flying, and we felt we could not justify permanent or even prolonged grounding.

Despite the fact that the conditions experienced by the patient are not enough to justify absolutely a diagnosis of traumatic pneumothorax, we believe that the case must be regarded as a spontaneous pneumothorax brought about by the following traumatic conditions: 1. Decrease in atmospheric pressure. Before the dive commenced, there was a cabin pressure of about 15,000 ft., or about 50% atmospheric pressure, which would tend to bring about a balloon-



Chest x-ray showing 90% collapse of left lung with minimal mediastinal shift at time of patient's admission to hospital.

inflating type of phenomenon with rupture of a pleural bleb and pneumothorax. Also, there was the added paradox of the rupture probably occurring during an increase of atmospheric pressure from 50% to about 70% during the dive; however, any change in pressure could bring about stress and subsequent rupture in a bleb which did not always freely communicate with a larger bronchiole. 2. Gravitational force of the pull-out. 3. Marked increase in intra-abdominal and consequently in intrathoracic pressure brought about by G-suit pressure and the natural straining against the G-suit and G forces. (A G-suit is a tight-fitting, pants-like outfit which applies pressure, by means of automatically inflated rubber bladders, to the calves, thighs, and abdomen in order to prevent pooling of blood in the extremities from increased gravitational force.) 4. Torsion of the body while the pilot was craning his neck aft to watch the chase plane.

Persons suffering spontaneous pneumothorax may be divided into two large groups: the pathological and the so-called healthy groups.[3] The pathological cases are those in which there is associated pulmonary disease, such as tuberculosis, emphysema, bronchiectasis, empyema, asthma, lung abscess, carcinoma (primary and metastatic), pneumonia, and pulmonary infarction, in that order. These cases will not even be considered, because their existence should not be too difficult to establish.

The so-called healthy cases are generally considered to be due to rupture of bullous emphysema or visceral pleural blebs. Autopsies have shown that there are often valve-like pieces of tissue present, which could conceivably lead to increased pressure and rupture.[4] However, this is usually a clinical diagnosis, since ordinarily there is no radiologic evidence of the disorder and since the treatment is usually conservative. Thus few patients become subject to surgical intervention, and consequently definite verification of the diagnosis is not obtained.

A survey of several large series of patients puts the recurrence rate at about 15%.[5] The condition is most common in the second and third decades of life. It is more common in males than females, and the right lung is more often affected than the left. The figures and opinions concerning the effect of physical exertion on bringing on the condition vary from no effect to 20%; however, the average figures on the number of patients engaged in physical exertion at the time of a spontaneous pneumothorax is about 15%. Thus it is obvious that there is a very real possibility of recurrence in flight or elsewhere.

The United States Navy and Air Force,[6] in general, do not restrict aviators from further flying until the second recurrence, at which time they are permanently grounded. The (British) Royal Air Force usually requires aviators to undergo "pleurodesis" (stimulation of pleural adhesions by instillation of an irritant, usually dilute silver nitrate, into the pleural cavity) before allowing further flying.

Program for Aviators

Obviously no dogmatic policy applies or can well be formulated, but a conservative program for well-motivated, otherwise healthy, career aviators might be as follows: 1. Surgical intervention should be performed if at all indicated in order to determine cause of spontaneous pneumothorax and to prevent possible recurrence from other blebs, with possible irritative stimulation of pleural adhesions. 2. After complete reexpansion of the lung, test runs should be made in low-pressure chambers under close medical supervision. 3. There should be restriction to nonsolo flights for a period of time, possibly three months. 4. Discussion of the problem with the patient is necessary, so that he will be aware of the symptomatology of the disorder and of the necessity of prompt medical attention in the event of recurrence.

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The opinions expressed in this article are those of the authors and are not necessarily those of the Department of the Navy.

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COUNCIL ON FOODS AND NUTRITION

Report to the Council

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PHILIP L. WHITE, SC.D., *Secretary.*

AMINOACIDURIA IN RELATION TO DEFICIENCY DISEASES AND KIDNEY FUNCTION

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and

Helen C. Harrison, Ph.D., Baltimore

The urinary excretion of free amino acids by the normal person is slight; urine amino nitrogen accounts for only about 1 to 2% of total urine nitrogen. Together with free amino acids, the so-called combined amino acids, which are converted to free amino acids by acid hydrolysis, are present in urine. The amino acids that are found in increased amounts after acid hydrolysis are mainly aspartic acid, glutamic acid, and glycine, which come from the hydrolysis of asparagine, glutamine, and hippuric acid. In addition, other amino acids are released from the small amounts of peptides present in the urine.

The free amino acids of plasma are ultrafiltrable, and their concentration in glomerular filtrate can be assumed to be the same as that in plasma water. If the quantity of amino acids estimated to be present in the total glomerular filtrate formed is compared with the free amino acids in urine, it becomes evident that all but a small fraction of filtered amino acids is normally reabsorbed by renal tubules. If plasma amino acid levels are raised so that the load presented to the tubules is sufficiently increased, tubular reabsorption is less complete, and increased excretion of amino acids in urine results. This hyperaminoacidemic or "overflow" aminoaciduria is analogous to the glycosuria resulting from hyperglycemia. Aminoaciduria may occur, however, with normal or even reduced concentrations of amino acids in plasma. This may be termed renal aminoaciduria, implying impairment of tubular reabsorption of amino acids by analogy with renal glycosuria.

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In the past few years, methods for qualitative detection and quantitative determination of individual amino acids have been developed, so that studies of the concentrations of individual amino acids in plasma and urine in various disease states are now feasible. Paper chromatography makes possible the qualitative identification of the amino acids, and it can also be used for quantitative measurements.[1] This technique accomplishes the separation of amino acids on filter paper by means of the relative solubilities of the acid in organic solvents and water. More precise quantitative determinations of separate amino acids can be made by column ion-exchange chromatography.[2] In this method a solution of amino acids is applied to a column of ion-exchange resin that binds the amino acids; the acids are then eluted by the flow of solutions of progressively increasing pH through the column. They are separated as they are eluted from the column and can be quantitatively measured in the various eluate fractions. Quantitative determination of amino acids may also be made by microbiological assay. In addition, the quantity of certain amino acids may be measured by specific chemical or physical methods. Among the results obtained by these various methods, some discrepancies are found, but on the whole the agreement is adequate to permit calculation of normal values.

Normal Urinary Excretion of Amino Acids

The problem of aminoaciduria is complex because more than 20 individual amino acids are present in the plasma in varying concentrations, and they are reabsorbed with varying degrees of efficiency by renal tubules. In figure 1 the concentrations of amino acids in the plasma of normal persons are shown and com-

pared with average daily excretion of these amino acids in urine. These values have been recalculated from Evered's data.[3] The differences in the relative proportions of amino acids in plasma and urine indicate that noticeable differences occur in the reabsorption of individual amino acids by the renal tubules. Glycine and histidine are less completely reabsorbed than the other amino acids, and certain of the essential

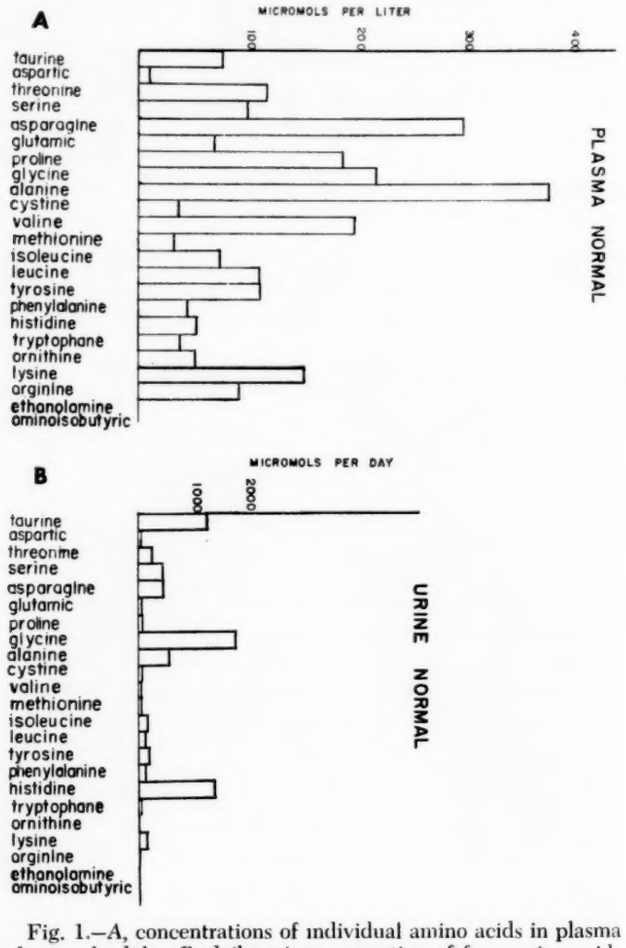


Fig. 1.—*A*, concentrations of individual amino acids in plasma of normal adults. *B*, daily urinary excretion of free amino acids by normal adult males.

amino acids—methionine, valine, leucine, isoleucine, and phenylalanine—are almost completely reabsorbed from glomerular filtrate. Therefore, the quantity of individual amino acids in urine reflects both the concentration of the amino acid in plasma and the degree of its reabsorption by renal tubules. Both hyperaminoacidemic and renal aminoaciduria can be specific either for a single amino acid or for limited groups of amino acids, or generalized with increased excretion of all or almost all of the plasma amino acids, even though in varying amounts.

In the normal person, urinary amino acid excretion is not greatly increased after the ingestion of a protein meal, despite the occurrence of a measurable increase in plasma amino acids. The 24-hour excretion of amino acids by individuals on high-protein diets is, however, higher than that of persons with low protein intakes, particularly with respect to the excretion of histidine.[3] The plasma amino acid concentrations of the few infants studied have been approximately the same as those of adults.[4] Urinary amino acid excretion is greater in the infant than in the adult when compared to total urine nitrogen or weight, but estimated renal clearances corrected for surface area show no great differences between infants and adults. The relatively high urine amino acid nitrogen excretions of young prematurely born infants—3 to 4% of total urine nitrogen—might be a function of high protein intake or a result of less complete reabsorption of amino acids by immature renal tubular mechanisms.

Abnormal Urinary Excretion of Amino Acids

Phenylketonuria.—The most striking example of specific aminoaciduria of the hyperaminoacidemic type is the increased output of phenylalanine in the urine in phenylketonuria (phenylpyruvic oligophrenia) (fig. 2). In this inborn error of metabolism, the hydroxylation of phenylalanine to tyrosine, which is an essential step in the oxidation of phenylalanine, is defective.[5] Plasma levels of phenylalanine are markedly increased, and, correspondingly, the urinary excretion of phenylalanine is greatly elevated. The urinary excretion of other amino acids is not altered, but the excretion of phenylpyruvic and phenyllactic acids, metabolic products of phenylalanine, is increased.

Generalized in Severe Liver Damage.—Generalized hyperaminoacidemia and resultant "overflow" aminoaciduria are found in patients with severe liver damage (fig. 3) either because of infectious or toxic hepatitis with liver necrosis or because of cirrhosis with far-advanced destruction of liver parenchyma.[6] Tau-

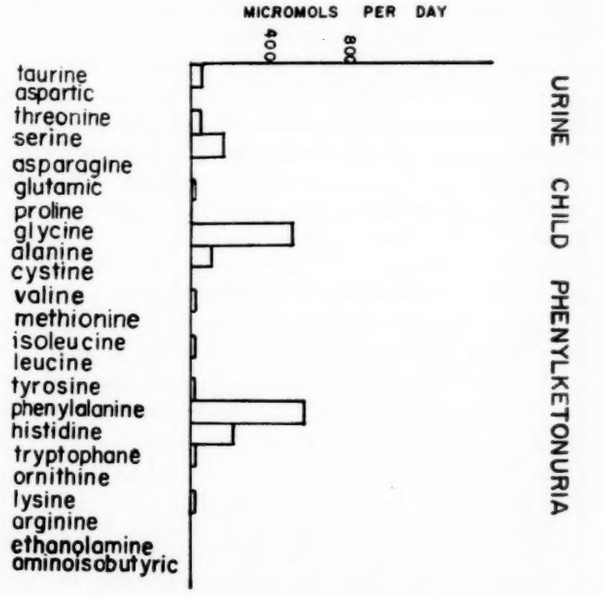


Fig. 2.—Daily excretion of amino acids in urine of child with phenylketonuria (recalculated data from Evered [3]).

rine, cystine, methionine, ethanolamine, and β-aminoisobutyric acid are found in relatively greater amounts in hepatic aminoaciduria than in the generalized renal aminoacidurias. The presence of these amino acids in disproportionate amounts in the urine may be an indication that the aminoaciduria is caused by hepatic failure.

Cystinuria.—Of the greatest clinical and physiological interest are the aminoacidurias of renal origin, for which defects of renal tubular reabsorption of amino acids are responsible. They also may be specific or generalized. Among the specific renal aminoacidurias, cystinuria is the one about which most is known. This hereditary disturbance was the earliest of the aminoacidurias to be recognized clinically. Its early recognition resulted from the crystallization of cystine in the urine and the formation of cystine calculi caused by the relative insolubility of cystine in acid or neutral solutions. Only recently, however, has the pathogenesis of cystinuria been explained. Not only cystine, but also lysine, arginine, and ornithine are excreted in excessive amounts (fig. 4). The plasma concentrations of these amino acids are not elevated, and evidence indicates that there is not a generalized disturbance of cystine metabolism in the tissues. Rather, a limited defect of the renal tubular reabsorption of the amino acids cystine, lysine, arginine, and ornithine occurs.[7] Other amino acids are handled in a normal fashion.

It is of interest to note that loading dogs with arginine increases the clearances of lysine, and injections of lysine cause increased renal clearances of arginine. These two amino acids appear to share some common mechanism in the renal tubules.[8] In patients with cystinuria, the increased cystinuria that follows ingestion of cysteine or methionine is caused by the normal conversion of these amino acids to cystine, with consequent elevation of plasma cystine levels and increase in the amount of cystine filtered through the glomeruli. It has been estimated that practically all of the cystine filtered may be excreted in the urine of patients

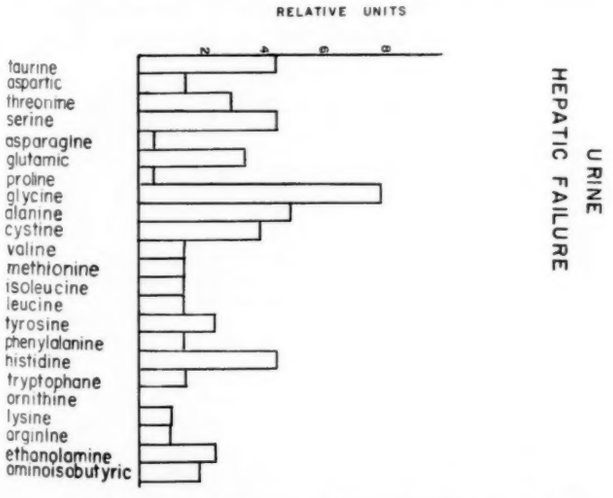


Fig. 3.—Amino acids in urine of patient with severe hepatic disease. On this scale the excretion of amino acids in normal subjects was: glycine, 3 units; taurine, 1.5 units; and histidine, 0.5 units.

with cystinuria. The only clinical consequence of this disorder is the formation of renal calculi due to precipitation of cystine.

More intensive studies of amino acid excretion in apparently normal persons have revealed other examples of specific renal aminoacidurias in which excretion of a single amino acid is increased without evident physiological disturbance.[3]

Renal Aminoaciduria: Fanconi Syndrome

General.—The generalized renal aminoaciduria that has received the greatest attention is that associated with the Fanconi syndrome. The earliest reports of this syndrome described a hereditary error of metabolism in children. These children manifested disturbances of growth and the bony changes of rickets associated with hypophosphatemia, chronic metabolic acidosis, glycosuria, and excessive amounts of organic acids in the urine that were later shown to be amino

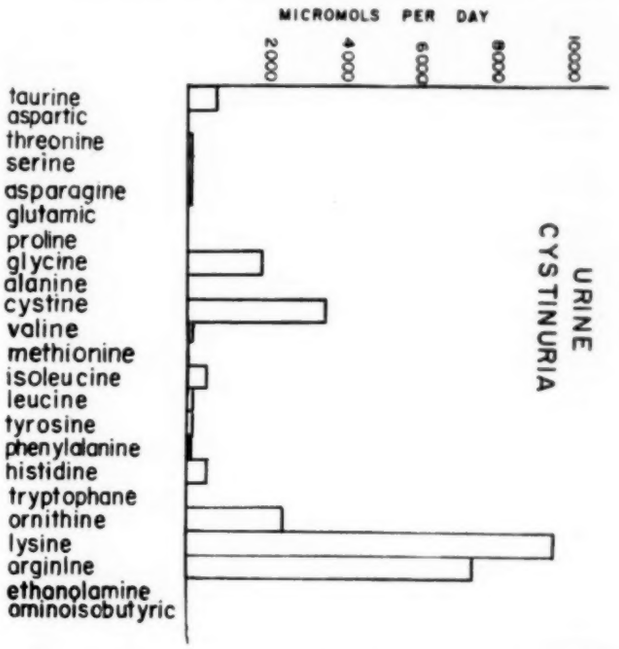


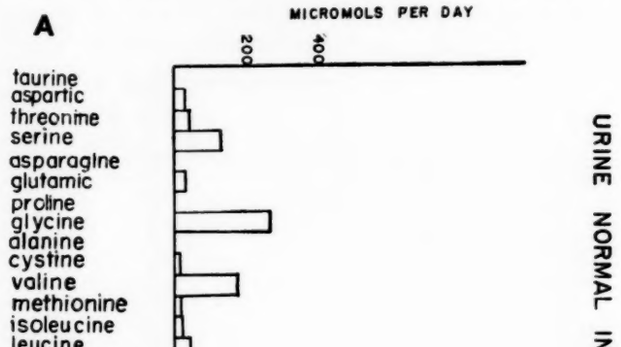
Fig. 4.—Daily urinary excretion of amino acids by patient with cystinuria (recalculated data from Evered [3]).

acids.[9] The application of the paper chromatographic method of urine amino acid identification by Dent gave a great impetus to the study of this syndrome, and the aminoaciduria was found to be a generalized one. In absolute terms, the excretion of glycine, the amino acid normally present in the largest quantity in the urine, is increased to a greater extent than other amino acids. Yet the most striking proportionate increases are in the excretion of amino acids that have low endogenous clearances in the normal person (fig. 5). The excretion of threonine, serine, alanine, tyrosine, and lysine may be more than 20 times greater than in the normal subject. Noticeably increased excretion of such essential amino acids as leucine, isoleucine, valine, methionine, and phenylalanine, which are ordinarily excreted in only trace amounts, also occurs. Cystine output, although somewhat increased, is not as great as in patients with cystinuria.

Cystinosis.—Investigations have shown that in the hereditary form of the Fanconi syndrome, which has its onset in infancy, there is an abnormality of cystine metabolism with deposition of cystine in the tissues. Cystine crystals are found primarily in macrophages in the reticuloendothelial system, including liver, spleen, bone marrow, and lymph nodes, as well as in kidney and subcutaneous tissue. Cystine crystals are also found in the cornea where they can be seen

by slit lamp microscopy, a helpful diagnostic tool. This variety of Fanconi syndrome is referred to as cystine storage disease or cystinosis, and sometimes the eponymic designation, Lignac-Fanconi syndrome, is used.[10]

Because of the discovery of cystine crystals in tissues, the theory that the aminoaciduria of cystinosis is due to hyperaminoacidemia has been proposed.



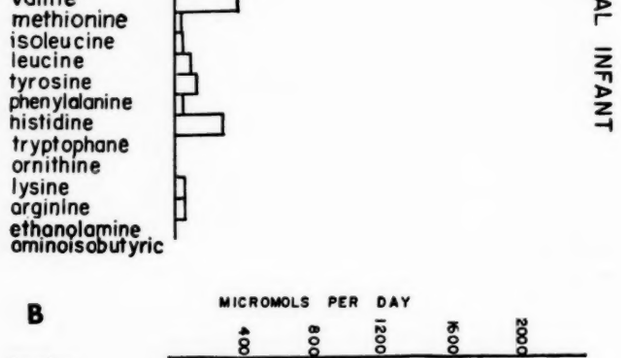


Fig. 5.—*A*, urinary excretion of amino acids by normal infants (according to Jonxis [4a]). *B*, urinary excretion of amino acids by child with Fanconi syndrome caused by cystine storage disease.

More recent studies have indicated, however, that the concentrations of the individual amino acids in plasma are not elevated but that the clearances of amino acids are greatly increased, thus indicating a generalized defect of tubular reabsorption of amino acids.[3] The glycosuria shown by these patients is also of renal origin because of the impairment of tubular reabsorption of glucose. The hypophosphatemia is likewise considered to be the result of a defect in the renal tubular mechanism for reabsorption of phosphate. The latter is one of the important regulatory mechanisms in the maintenance of serum phosphate levels. Other manifestations of abnormalities of renal tubular functions sometimes observed are chronic acidosis and the tendency to lose potassium. It has been suggested that there is a congenital anatomic defect associated with the functional defect, since microdissection of nephrons from kidneys of patients with the Fanconi syndrome has shown an unusual narrow segment of tubule, linking glomerulus and proximal convoluted tubules, resulting in a shortening of the true proximal convoluted tubule.[11] Opposed to the concept of a primary congenital defect of the tubule is an observation made in infants from a family with multiple cases of cystinosis. Careful study of these infants from birth indicated that glycosuria, aminoaciduria, and hypophosphatemia were not present at birth but appeared after several months. These defects were preceded by the appearance of cystine crystals in tissues.[12] The interpretation of these observations is that the primary and as yet unidentified metabolic defect in cystinosis leads to increased cystine content of tissues and that renal tubule injury results only after some period of time. This concept is important because Fanconi syndrome, using the term as applied to the constellation of hypophosphatemia with rickets or osteomalacia, renal glycosuria, and renal aminoaciduria, can occur sporadically in older children and adults without familial incidence and without evidence of cystine deposition in tissues. In this group the functional lesion of the renal tubules is caused by some metabolic injury other than the specific defect of cystinosis, although the disturbance of renal tubular function, the pattern of aminoaciduria, and many of the clinical manifestations are similar to those seen in cystinosis (fig. 6).

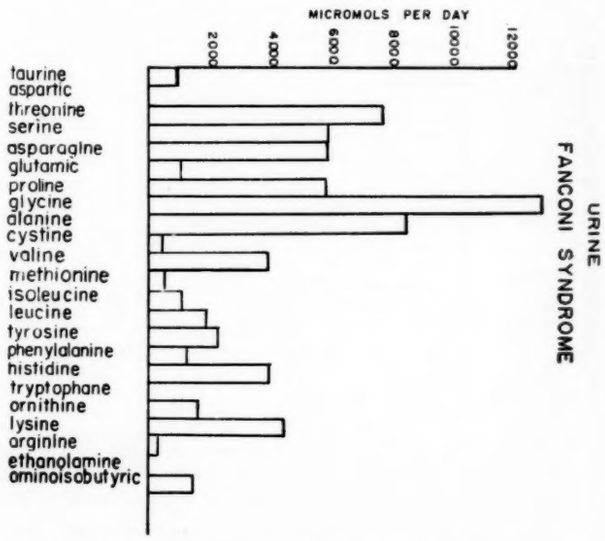


Fig. 6.—Urinary excretion of amino acids by adult with Fanconi syndrome of unknown etiology (recalculated data from Evered [3]).

Heavy Metal Toxicity.—The renal tubular dysfunction characteristic of the Fanconi syndrome can be produced by known toxic agents. The heavy metals uranium, lead, and cadmium have been found to cause renal aminoaciduria and glycosuria in exposed

subjects.[13] At least one instance of lead poisoning in a child has been reported in which aminoaciduria and glycosuria were also associated with persistent hypophosphatemia and rickets.[14] In this child the acquired Fanconi syndrome was resolved after treatment of the lead poisoning. Experimentally, renal glycosuria, phosphaturia, and aminoaciduria have been produced in rats by injection of an organic acid –maleic acid.[15] All of this evidence suggests that the Fanconi syndrome may have multiple etiologies in which the common denominator is renal tubular injury with impairment especially of the systems that are important in the renal tubular handling of amino acids, glucose, and phosphate.

Renal Aminoaciduria in Galactosemia and Wilson's Disease

Generalized renal aminoaciduria may also be found without glycosuria or disturbance of phosphate regulation. Aminoaciduria has been reported in galactosemia and in Wilson's disease, both genetically determined metabolic disorders. In both, aminoaciduria is apparently a manifestation of renal tubular dysfunction secondary to the primary metabolic defect. In galactosemia, in which there is a block in the metabolism of galactose, the aminoaciduria disappears if a diet free of galactose is fed. In Wilson's disease a deficiency of ceruloplasmin, the copper-binding protein of plasma, is associated with increased absorption and retention of copper in body tissues. The renal tubular defect appears late and is presumed, therefore, to be a remote effect of the primary disturbance of copper metabolism. Although the renal aminoaciduria of Wilson's disease is not ordinarily

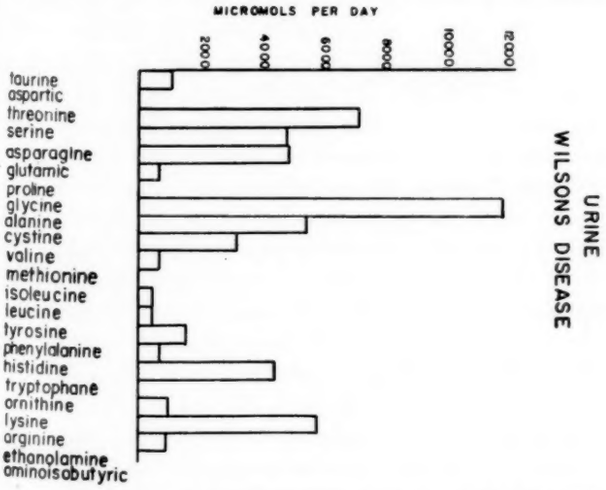


Fig. 7.—Amino acid excretion in urine of patient with Wilson's disease (according to Stein and co-workers[16b]). Note similarity of pattern of aminoaciduria to that of adult with Fanconi syndrome of unknown etiology (fig. 6).

associated with the other renal tubular disorders of the Fanconi syndrome, glycosuria and hypophosphatemia with osteomalacia have been reported in a few patients.[16] Studies by the paper chromatography method have suggested that there are qualitative differences among the various renal aminoacidurias in the pattern of amino acids excreted, but in many instances the differences are quantitative rather than qualitative (fig. 7). If the aminoaciduria is of only moderate degree, certain amino acids may not be excreted in sufficient amounts to be detected by the qualitative method. However, a special group of patients with hypophosphatemia and osteomalacia have been reported, in whom the excretion of glycine was increased without proportionate increase of other

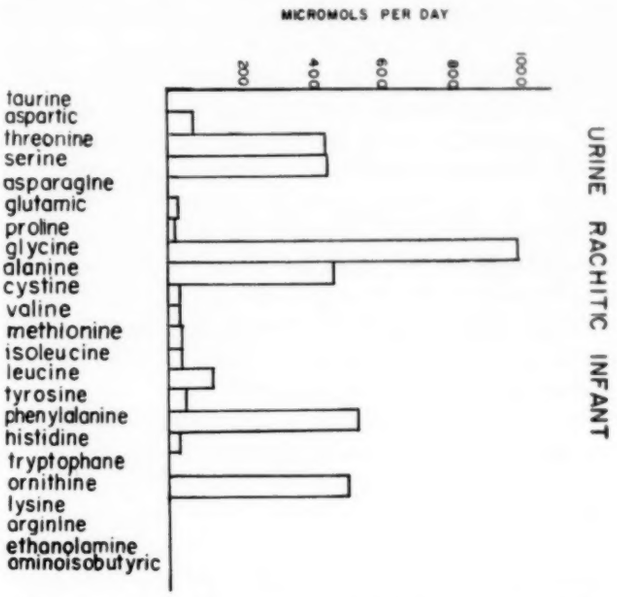


Fig. 8.—Amino acid excretion of infant with vitamin D deficiency rickets (according to Jonxis[4a]).

amino acids.[17] The number of syndromes in which renal aminoaciduria is found has been expanded rapidly in recent years, and it is highly likely that additional ones will be discovered as studies of amino acid excretion are made in obscure metabolic disorders.

Renal Aminoaciduria in Vitamin D Deficiency

An interesting and theoretically important group of generalized renal aminoacidurias is that group associated with vitamin deficiency states. Renal aminoaciduria has been reported in infants both with vitamin D and with vitamin C deficiencies. The aminoaciduria of vitamin D deficiency is particularly significant, since the excretion of free amino acids by infants with vitamin D deficiency rickets may be qualitatively similar to that seen in the Fanconi syndrome; however, it is quantitatively less pronounced (fig. 8).

The greatest proportionate increases, in comparison with the excretions of the normal infant, are in the excretion of threonine, serine, and alanine. In this infant the excretions of valine, methionine, leucine, isoleucine, and phenylalanine are also slightly increased. In infants with vitamin D deficiency rickets whom we have studied, the excretion of these essential amino acids was significantly increased, as measured by semiquantitative paper chromatography. Treatment with vitamin D results in a return of amino acid excretion to normal, although the effect of vita-

min D on aminoaciduria lags behind its action on the calcium and phosphorus levels of plasma and the initiation of healing of the rickets.

At first glance, the wide spectrum of errors of metabolism, toxic injuries, and deficiency states in which generalized renal aminoaciduria of varying degrees may be found, appears to blur the significance of this manifestation. It would seem that renal tubular reabsorption of amino acids is extremely sensitive to a variety of factors that interfere with renal tubule cell metabolism and diminish the efficiency of tubular reabsorption of these vital substances. However, aminoaciduria does not occur in diffuse renal diseases, with glomerular injury such as chronic pyelonephritis, chronic glomerulonephritis, and nephrosclerosis,[18] although it has been reported in children with the nephrotic syndrome.[19] Certain specific types of tubular dysfunction are also not always associated with aminoaciduria; for example, aminoaciduria is not a constant finding in renal tubular acidosis in which the renal tubule mechanisms concerned with the formation of acid urine are abnormal.

In some patients with renal tubular acidosis and associated hypophosphatemia and rickets, generalized aminoaciduria does occur. It responds to treatment with vitamin D and alkalinizing salts, just as does the aminoaciduria of vitamin D deficiency rickets. The administration of acetazolamide (Diamox), which is believed to inhibit the secretion of H^+ ion in exchange for Na^+ or K^+ in the renal tubule, does not produce any considerable degree of aminoaciduria. Renal glycosuria of the congenital type is presumably an isolated defect of tubular reabsorption of glucose, but, in one case of renal glycosuria studied, the glycosuria was associated with generalized aminoaciduria similar to that seen in the Fanconi syndrome. This patient showed normal levels of phosphate in serum and no osteomalacia. Further studies of other cases of renal glycosuria regarding the presence of aminoaciduria would be of interest.

A most intriguing problem is the relationship of renal aminoaciduria to disturbances of phosphate metabolism and to vitamin D function. In vitamin D deficiency states, renal aminoaciduria is found; a defect of renal tubular reabsorption of phosphate also occurs, which is important in the genesis of the hypophosphatemia of rickets and osteomalacia. The association of renal aminoaciduria, glycosuria, and a defect of renal tubular reabsorption of phosphate in the Fanconi syndrome has already been emphasized. Clinical poisoning with lead or other heavy metals and experimental maleic acid poisoning can likewise produce the combined defects of renal aminoaciduria, glycosuria, and phosphaturia. This might be explained by the postulation that a common renal tubular transport system for amino acids, phosphate, and glucose exists. There is some evidence of mutual interference between glycine and phosphate in tubular function, but renal aminoaciduria may occur without disturbance of phosphate metabolism and without glycosuria, thus, these tubular functions may be altered independently of each other. It may be significant, however, that vitamin D administration can influence aminoaciduria when the aminoaciduria is associated with a defect of tubular function involving phosphate regulation. This is true in simple vitamin D deficiency states in which the aminoaciduria gradually returns to normal after physiological doses of vitamin D. In the Fanconi syndrome, whether it is due to cystinosis or to other mechanisms, the aminoaciduria can also be reduced, although not necessarily restored to normal values, by large doses of vitamin D. It would be interesting to explore the effect of vitamin D in those cases of Wilson's disease or other forms of generalized renal aminoaciduria in which no obvious defect of tubular reabsorption of phosphate is present. The effect of vitamin D upon renal aminoaciduria in ordinary rickets and in the Fanconi syndrome would be consistent with the previously suggested hypothesis that one of the mechanisms of action of vitamin D is through an effect upon the function of the renal tubules.

Summary

Aminoaciduria may result from disturbances of the metabolism of amino acids that cause their concentrations in plasma to increase, or from defects of renal tubular reabsorption of amino acids, in which case the levels of amino acids in plasma are normal or reduced. In either type, the defect may be specific for a single amino acid or a limited group of amino acids, or it may be generalized, involving essentially all of the amino acids. Differences among the amino acids exist normally, concerning their concentration in plasma and also the completeness with which they are reabsorbed by the renal tubules. There are also corresponding differences in the degree to which the concentrations of individual amino acids are increased in the urine in the generalized type of renal aminoaciduria. Renal aminoaciduria may result from many types of renal injury caused by inborn errors of cell metabolism, toxic agents, or vitamin deficiency states. The association of renal aminoaciduria with renal glycosuria and phosphaturia and with hypophosphatemic rickets or osteomalacia known as the Fanconi syndrome may be caused by a congenital metabolic defect or by acquired renal tubular injury. Vitamin D either directly or indirectly influences the renal tubular mechanisms involving reabsorption of amino acids and phosphate. In certain varieties of renal aminoaciduria associated with a disturbance of phosphate metabolism, amino acid excretion may be reduced or restored to normal by administration of vitamin D.

The application of newer techniques for measuring individual amino acids in urine has proved valuable in increasing our understanding of physiological disturbances in which amino acid metabolism or renal

tubular function is altered. These methods also have facilitated the separation of certain clinical syndromes and have indicated interrelations among apparently distinct disease states. The wide variety of metabolic disturbances in which generalized renal aminoaciduria is found indicates that renal tubular reabsorption of amino acids is highly sensitive to injurious agents. Although the relative proportions of individual amino acids in the urine may be similar in renal aminoacidurias of diverse pathogenesis, some differences have been found that may be of value in differentiation of various syndromes. The losses of amino acids per se in the urine have not been shown to be of sufficient magnitude to produce amino acid deficiencies under ordinary dietary conditions. The only important disturbance that is the direct result of excessive amounts of amino acids in the urine is the precipitation of cystine calculi in the urinary tract in cystinuria. However, the measurement of individual amino acids in urine can be of value in the diagnosis of specific metabolic derangements and can increase our understanding of interrelations among a variety of disease states in which aminoaciduria is a common finding.

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CHEMICAL LABORATORY

The Chemical Laboratory has authorized publication of the following statement.

WALTER WOLMAN, PH.D., *Director.*

Monographs of tests and assays for new and nonofficial drugs adopted by the Chemical Laboratory of the American Medical Association represent an expression of opinion as to what might constitute adequate tests and assays to serve as a reference guide to those interested in the identity and quality of a new and nonofficial drug.

Completed monographs are published in the journal *Drug Standards* for those interested in the details of the procedures. Monographs on the following drugs have appeared in the May-June, 1957, issue of that journal. The cooperation of the listed pharmaceutical firms that furnished samples and data is acknowledged.

Butabarbital sodium .....(The Bowman Bros. Drug Co.)
(Chemo Puro Mfg. Corp.)
(McNeil Laboratories, Inc.)
(Premo Pharmaceutical Labs., Inc.)

Crotamiton .....(Geigy Pharmaceuticals)

Diatrizoate sodium .....(Winthrop Laboratories)

Ethinamate .....(Eli Lilly & Company)

Meprobamate .....(Wallace Laboratories)
(Wyeth Laboratories)

Methoxsalen .....(Paul B. Elder Company)

Methscopolamine bromide ..(Lincoln Laboratories, Inc.)
(The Upjohn Company)

Methscopolamine nitrate ....(R. J. Strasenburgh Co.)

Oxtriphylline .....(Nepera Laboratories Division, Warner-Lambert Pharm. Co.)

Pipradrol hydrochloride .....(The Wm. S. Merrell Co.)

Primidone .....(Ayerst Laboratories)

Propantheline bromide .....(G. D. Searle & Co.)

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TESTING FOR AMINOACIDURIA

Frequently the physician reads of some new laboratory procedure that is not adapted for the average clinical laboratory and yet is of such practical significance to his daily work that it immediately becomes a part of his diagnostic armamentarium. Such is the case of the testing for aminoaciduria, the interpretation of which is reported on page 1571 of this issue of THE JOURNAL.

The losses of amino acids, per se, in the urine have not been shown to be of sufficient magnitude to produce amino acid deficiencies under ordinary dietary conditions. Aminoaciduria results from disturbances of the metabolism of amino acids. It can equally result from defects in the renal tubular reabsorption of the same amino acids; and, in regard to this latter phase, etiology would include many types of renal injury caused by inborn errors of cell metabolism, toxic agents, or vitamin deficiency states. In other words, studies revealing renal aminoaciduria are important in the elucidation of the mechanism of disease, as well as in diagnosis and treatment.

One of the many specific conditions in which a practitioner would want to determine urinary amino acid excretion would be in his effort to discover early stages of intoxication due to industrial exposure to heavy metals, particularly lead. The heavy metals, including uranium and cadmium, have been found to cause renal aminoaciduria (as well as glycosuria) as a reflection of renal tubular dysfunction. This same dysfunction can also be evidence of osteomalacia and rickets. Quantitative determinations revealing unusually high amounts should suggest Fanconi syndrome, a familial disease characterized by congenital hypoplasia of the bone marrow combined with various other congenital defects.

Another manifestation of congenital faulty metabolism often associated with mental defects, referred to as phenylketonuria, may be diagnosed or confirmed by testing for specific aminoaciduria. The test for phenylpyruvic acid in phenylketonuria may be negative for the first month or two of life, whereas the serum phenylalanine level is high and therefore the excretion of the amino acid phenylalanine is immediately increased. Early diagnosis of this condition is extremely important in infants who are siblings of similarly affected children.

Early diagnosis of cystinuria not only helps in discovering cases of this somewhat similar congenital dysfunction but is of even greater value since the affected individual can be informed of simple prophylactic measures, such as alkaline-ash diet and high fluid intake, which can prevent the formation of cystine calculi.

Recent reports show the occurrence of aminoaciduria in a familial pellagra-like disease. In liver diseases amino acid metabolism is also affected after the disease has progressed to the point of severe loss of hepatic function. While this does not seem of value in testing liver function during the early stages of liver disease, it does provide a measurement of progressive liver damage.

The determination of amino acids in the urine is now widely used in large clinical and research laboratories, as well as major teaching institutions. While it will probably be some time before this test is easily performed in the doctor's office, the physician in practice should be acquainted with aminoaciduria and its reflection of faulty metabolism or renal damage.

MEDICAL MEETING IN ISTANBUL

The annual congress of the World Medical Association will be held in Istanbul September 29 to October 5. Now 10 years old, the World Medical Association speaks with authority for doctors throughout the free part of the world and is the only organization which can speak broadly for the doctors on an international basis. The World Health Organization is, of course, of concern to many countries and their people, but its representatives are appointed by governments. Since membership in the World Medical Association is based on the national medical associations, this body speaks for the doctor. Its delegates and membership are not a government activity.

When the World Medical Association was created in Paris more than 10 years ago, there was fear that it might have a troublesome course because of restrictions on exchange of finances and also because of the lack of money in some areas. The problem was met by the creation of a United States Supporting Committee, supported by doctors and their medical organizations and by the drug industry. The guarantee of support was $50,000 a year for five years, but it was not long before more than this was being raised to provide for expanding activities. Today about three times this amount is raised in the United States alone, and for this doctors everywhere owe the members of the U. S. committee a lasting debt of gratitude. Now there are supporting committees in other countries. In addition, exchange of funds is easier, and the work of the World Medical Association is reflecting this situation. Thus those who attend the congress in Istanbul will see the work of a body with a membership of more than 50 national medical associations embracing more than 700,000 doctors throughout the free part of the world. A congress is held each year and in different parts of the world. In 1956 it was in Cuba. In 1959 it will be in Canada after the second World Conference on Medical Education, sponsored and organized by the World Medical Association and held in Chicago. In the meantime Istanbul welcomes doctors from everywhere.

ORGANIZATION SECTION

FEDERAL MEDICAL LEGISLATION

First Session, 85th Congress

Increased Wage Base Tax and Benefits Under Social Security

Representative King (D., Calif.), in H. R. 5549, has made several amendments to the Old-Age and Survivors Insurance section of the Social Security Act. He would increase the minimum survivors' or dependents' benefits from $30 to $37.50 per month and increase from $200 to $250 a month the maximum amount which the widow of a covered employee with a large family may receive through this program. He would raise the base salary upon which contributions are computed from the present $4,200 to $6,000 and would also raise the rate of contribution from the employees and employers from 2¼% to 3% each. By 1975, the employees and employers would pay 5% each on the $6,000 wage base. In the case of the self-employed the present contribution would be raised from 3⅜% to 4½%. By 1975, the self-employed would be paying 7½% on a $6,000 wage base or $450 a year.

Representative Dingell (D., Mich.), in H. R. 7669, would increase from $4,200 to $6,000 the amount of annual earnings which would be taken into account in computing benefits and which are subject to Social Security taxes. These measures were referred to the Ways and Means Committee.

Workmen's Compensation and Disability Benefits Under Social Security

Representative Dollinger (D., N. Y.), in H. R. 7601, proposes to amend the Social Security Act to provide that a person may receive workmen's compensation benefits and still receive the full disability insurance benefits under Social Security. This bill was referred to the Ways and Means Committee.

Pay-as-You-Go Social Security

Representatives Blatnik (D., Minn.), in H. R. 7086, and Burdick (R., N. D.), in H. R. 8099, propose a pay-as-you-go Social Security plan. Benefits would be financed by an equitable gross income tax. The disabled and persons 60 years of age or older would be eligible to receive a monthly benefit for as long as they live. Children under 18 years of age, dependent upon another beneficiary of the program, would receive a secondary benefit equal to one-third the amount paid to the primary beneficiary.

Representative Flood (D., Pa.), in H. R. 6412, would amend the Social Security Act to "provide that any fully insured individual who becomes permanently and totally disabled shall be deemed to have reached retirement age." The term "fully insured" would mean coverage for 40 quarters or one-half of the quarters from 1950 until the time of disability, with a minimum of 6 quarters required. The disabled applicant would no longer have to meet the requirement of being covered for 5 of the last 10 years and 1½ years of the last 3 years, nor would he have to wait until the age of 50 to be eligible to receive the benefits. All three bills were referred to the Ways and Means Committee.

Doctor-Draft Amendment

Representative Vinson (D., Ga.) introduced the administration's bill, H. R. 6548, to amend the Universal Military Training and Service Act, which would allow the President to issue special calls for physicians, dentists, and allied specialists by profession if they are liable under the Basic Selective Service Act and have been deferred for educational training. The maximum age limit was set at 35. Alien physicians who come to this country after they are 26 years of age are not liable for service. Hearings were held promptly by the House and Senate armed services committees, which approved the measure. The bill was passed by both Houses, was signed by the President, and became Public Law 85-62.

Commission on the Doctor Shortage in the United States

Representative Dorn (R., N. Y.), in H. R. 6602, proposes to establish "a commission to study the shortage of doctors of medicine in the United States."

The Commission shall conduct a full and complete investigation and study of the shortage of doctors of medicine in the United States, giving particular attention to:

(1) the policy of medical colleges in the United States of limiting the number of students admitted to study medicine;

(2) the number of doctors of medicine being graduated annually from medical colleges in the United States;

(3) the extent to which hospital administrators in the United States are required to seek doctors of medicine in foreign countries for the purpose of inviting such doctors to serve internships in the United States;

(4) how many citizens of the United States who cannot gain admittance to medical colleges in the United States are going to foreign countries to study medicine; and

(5) the extent to which the several States of the United States and the District of Columbia permit doctors of medicine who have been graduated from medical colleges in foreign countries to practice medicine in such States or the District of Columbia.

The commission would submit a report to Congress making recommendations for administrative or legislative action. This measure was referred to the Committee on Interstate and Foreign Commerce.

From the Washington Office of the American Medical Association.

Registration and Reporting of Welfare and Pension

A series of bills have been introduced which call for the registration and reporting of welfare funds. Some would require registration with the Secretary of Labor, others with the Federal Security and Exchange Commission. These bills are H. R. 6649, H. R. 6650, and H. R. 7960, Ostertag (R., N. Y.); S. 2137, Allott (R., Colo.); H. R. 7607, Price (D., Ill.); H. R. 7802, Frelinghuysen (R., N. J.); S. 2175, Ives (R., N. Y.); and H. R. 8004, McGovern (D., S. D.). The Senate bills were referred to the Labor and Public Welfare Committee and the House measures to the Education and Labor Committee.

Vocational Rehabilitation

Extension of Expansion Grants.—Representative Wright (D., Texas), in H. R. 5759, proposes to extend to June 30, 1958, the special federal grants to state and nonprofit organizations and agencies for planning and initiating expansion of vocational rehabilitation programs in the states. The present authorization expires June 30, 1957. This proposal was referred to the Committee on Education and Labor.

Lengthening Traineeships in Physical Medicine.—Senators Smith (R., N. J.) and Purtell (R., Conn.), in S. 1971, and Representative Haskell (R., Del.), in H. R. 7155, have introduced identical measures which would give authority to the Office of Vocational Education to finance, through the states, traineeships in physical medicine and rehabilitation for courses extending in excess of two years. The Senate bill was referred to the Labor and Public Welfare Committee. The House bill was referred to the Committee on Education and Labor.

Demonstration Rehabilitation Center.—Senator Robertson (D., Va.) has introduced, in S. 2068, a bill "to amend the Vocational Rehabilitation Act with respect to the pilot demonstration rehabilitation center in the Washington area" to read as follows: "Sums made available for such a pilot demonstration center in the Washington area may be used for the construction of facilities, including future expansion, equipment, and such services as hospitalization, domiciliary care, and rehabilitation training, including costs of board and room of trainees and other services essential to the program, as in the discretion of the Secretary are deemed desirable." This would provide the designated hospital 100% of the funds needed to construct and equip it as a Washington, D. C., area pilot demonstration center. This bill was referred to the Committee on Labor and Public Welfare.

Overseas Medical Care for Federal Employees and Dependents

Representative Morrison (D., La.), in H. R. 6141, has introduced the administration's proposal to extend the federal program for the care of all civilian overseas employees who are citizens of the United States and their dependents residing in areas outside the continental United States. Under the present law enacted by Congress last year, only the foreign service employees of the Department of State were covered. The Morrison proposal would extend this to all United States citizen government employees overseas. The program would provide, without cost to the employee, free physical examinations in connection with government employment abroad. Similarly, immunizations would be given if deemed necessary to protect the health of such employees and their dependents. Travel necessary in obtaining medical care would be compensated for by the government. Outpatient and hospital care could be given in facilities of the agency or other federal agencies, or through cooperative arrangements with foreign governments by purchase on a fee or contract basis for such services, or by any other appropriate means. The agency would pay for the cost of care for the employees and would provide such services to dependents at charges prescribed by the President. In a private hospital the charges for dependents would be the amount of actual charges up to $25 or a daily rate prescribed by the President, multiplied by the days hospitalized, whichever amount is greater. The federal agencies would be given authority to establish first-aid stations, clinics, or dispensaries, and provide the services of physicians and other medical personnel at posts in overseas areas if there is sufficient personnel to warrant such actions and if local facilities are inadequate to meet local health needs of employees and their dependents and there are no adequate facilities maintained in such areas by any other agency.

The Department of Defense would be given the right to provide all medical services for its civilian overseas employees and for their dependents subject to the availability of space, facilities, and capabilities of the medical staff. This bill was referred to the Committee on Post Office and Civil Service.

Chiropractors in Workmen's Compensation and in the Medical Service Corps of the Army

Senator Cooper (R., Ky.), by request, has introduced a measure, S. 1650, to amend the United States Employees' Compensation Act to authorize the furnishing of chiropractic services to injured federal employees. This measure was referred to the Committee on Labor and Public Welfare.

Senator Case (R., S. D.), by request, has introduced a measure, S. 2072, which would establish a chiropractic section in the Medical Service Corps of the Army. The chiropractors would be required to be graduates of an accredited school of chiropractic approved by the surgeon general. This measure was referred to the Committee on Armed Services.

Loans to Nonprofit Health Associations

Senator Humphrey (D., Minn.), in S. 1667, reintroduced a measure almost identical to his previous bill which would "assist voluntary nonprofit associations offering prepaid health service programs to secure

necessary facilities and equipment through long-term, interest-bearing loans." He would authorize the appropriation of 5 million dollars for the fiscal year ending June 30, 1957. A similar sum would be appropriated for the fiscal year ending June 30, 1958, and 10 million dollars for each of the next succeeding three years, at an interest rate not to exceed 2% per annum and could be amortized over a 25-year period. Applicants must have at least 10% of the proposed loan. The measure was referred to the Labor and Public Welfare Committee.

Tax Deductions for Higher Education

Senator Magnuson (D., Wash.) proposes, in S. 1797, to amend the Internal Revenue Code to allow a taxpayer, in calculating his income tax, to deduct expenses paid in obtaining a higher education for his spouse or children. The reductions would be made from his adjusted gross income. Expenses were defined as:

(A) tuition and fees required for matriculation and attendance at an institution of higher learning, or for fees required for enrollment in a course of instruction at an institution of higher learning,

(B) books, supplies, and equipment required in a course of instruction at an institution of higher learning, and

(C) travel and living expenses while away from home for the purpose of attending an institution of higher learning, but only to the extent that such travel and living expenses incurred by any individual do not exceed $1,000 during any taxable year.

This was referred to the Committee on Finance.

Representatives McDonough (R., Calif.), in H. R. 6459, and Collier (R., Ill.), in H. R. 7566, have introduced identical measures which would permit a taxpayer, in calculating his income tax, to deduct from his gross income the expenses paid during the taxable year for the education of a dependent at a college or university and for his maintenance while pursuing such education.

Representative Frelinghuysen (R., N. J.), in H. R. 7002, would amend the Internal Revenue Code to provide a 30% credit against the calculated individual income tax [not gross income] for tuition and fees paid during the year to an institution of higher education for "such individual or of any other individual at a level above the twelfth grade." This measure is identical to H. R. 490 by Representative Thompson (D., N. J.), previously reported.

Representative Byrne (R., Ill.), in H. R. 7127, proposes "to increase the amount of the personal exemption to which a taxpayer is entitled with respect to a dependent who is a student and whose educational expenses are paid by such taxpayer." The exemption would be against the adjusted gross income not calculated income tax as in the Frelinghuysen bill. Representative Byrne's measure would raise the taxpayer's exemption from $600, as provided in the present law, to $700 if the dependent is enrolled in the first eight grades; $800 of the dependent is enrolled in grades 9 through 12; and $900 if the dependent is enrolled in any level higher than the 12th grade. All of the above measures were referred to the Ways and Means Committee.

Salary and Organization Adjustments in the VA Department of Medicine and Surgery

Representative Long (D., La.), in H. R. 6719, proposes the following grade salary structure for the department of medicine and surgery of the Veterans' Administration: chief medical director, $19,500 annually; deputy chief medical director, $18,500 annually; assistant chief medical director, $17,500 annually; 15 deputy assistant chief medical directors, $16,500 annually; 15 directors of service or chiefs of a division, $16,500 annually; director of nursing services, $12,690 annually; deputy director of nursing services, $10,320 annually; chief pharmacist, $12,690 annually; chief dietitian, $12,690 annually; chief physical therapist, $10,320 annually; and chief occupational therapist, $10,320 annually.

The grades in the various services are as follows:

MEDICAL SERVICE

Chief grade, $13,015 minimum to $14,200 maximum.
Senior grade, $11,820 minimum to $12,700 maximum.
Intermediate grade, $10,300 minimum to $11,500 maximum.
Full grade, $8,950 minimum to $9,950 maximum.
Associate grade, $7,650 minimum to $8,650 maximum.

DENTAL SERVICE

Chief grade, $13,015 minimum to $14,200 maximum.
Senior grade, $11,820 minimum to $12,700 maximum.
Intermediate grade, $10,300 minimum to $11,500 maximum.
Full grade, $8,950 minimum to $9,950 maximum.
Associate grade, $7,650 minimum to $8,650 maximum.
Junior grade, $7,000 minimum to $7,400 maximum.

NURSING SERVICE

Assistant Director, $8,010 minimum to $9,300 maximum.
Senior grade, $6,505 minimum to $7,795 maximum.
Full grade, $5,440 minimum to $6,250 maximum.
Associate grade, $4,730 minimum to $5,590 maximum.
Junior grade, $4,025 minimum to $4,885 maximum.

The bill would reduce the allowance for diplomates of the specialty boards from 25% to 10% "provided, that in no event shall the pay plus the allowance . . . authorized exceed $15,620 per annum."

Optometrists would be recognized in certain sections of the bill on the same level as physicians and dentists. The above measure was referred to the Committee on Veterans' Affairs.

Alien Physicians in the Veterans' Administration

Representative Knutson (D., Minn.), in H. R. 6897, would authorize the "appointment of any doctor to a position in the V. A. Medical Service if he: (1) has been lawfully admitted into the United States for permanent residence, (2) has filed a declaration of intention to become a citizen of the United States under section 334 (f) of the Immigration and Na-

tionality Act, and (3) is otherwise qualified for such appointment." This bill was referred to the Committee on Veterans' Affairs.

Chemical Additives in Food

Representative Harris (D., Ark), in H. R. 6747, and Senator Hill (D., Ala.) for himself and Senators Smith (R., N. J.) and Sparkman (D., Ala.), in S. 1895, have introduced identical bills which would amend the "Federal Food, Drug, and Cosmetic Act to prohibit the use in food of chemical additives which have not been adequately tested to establish their safety." Under this bill pretesting would be a responsibility of the manufacturer. The bill provides for study and recommendations of an advisory committee of experts selected from the National Academy of Sciences. An appeal mechanism would be established.

Representative Fulton (R., Pa.), in H. R. 7700, has introduced a similar measure but requires also in his measure that the chemical additive must not only be safe but serve a useful purpose to the consuming public.

Representatives Delaney (D., N. Y.), in H. R. 7798, and Sullivan (D., Mo.), in H. R. 7938, have introduced identical measures which are similar to H. R. 6747 mentioned above but have an additional requirement that "the Secretary shall not approve for use in food any chemical additive found to induce cancer in man, or, after tests, found to induce cancer in animals." The Senate measure was referred to the Labor and Public Welfare Committee. The House measures were referred to the Interstate and Foreign Commerce Committee.

Distribution and Sale of Hazardous Substances for Household Use

Representative Curtis (R., Mo.) proposes, in H. R. 7388, to regulate the interstate distribution and sale of packaging of hazardous substances intended for household use. He would require the proper labeling of packages to minimize the dangers inherent in their use. He defines toxic, poison, corrosive, irritant, radioactive, and inflammable, and places the responsibility for administering the program of regulation in the Department of Health, Education, and Welfare. This measure was referred to the Committee on Interstate and Foreign Commerce.

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COUNCIL ON NATIONAL DEFENSE

U.S.A.F. RESERVE HOSPITALS

The following report on U.S.A.F. Reserve hospitals has been approved for publication by the Committee on Military Medical Affairs, Council on National Defense, as an item of general interest to medical reserve personnel.

FRANK W. BARTON, *Secretary.*

To provide an increased mobilization medical capability, the U.S.A.F. Medical Service activated 10 general type reserve hospitals during April, 1957. These hospitals range in size from 250-bed to 1,000-bed capacities. These Air Force Reserve units are located in various cities, as listed in the table.

Location of Air Force Reserve Units

Medical Unit	Center	Location
616th U.S.A.F. Hospital	2347th ARFC	Long Beach, Calif.
635th U.S.A.F. Hospital	2610th ARC	New York City
637th U.S.A.F. Hospital	2692nd ARC	New Orleans
640th U.S.A.F. Hospital	2650th ARC	Chicago
622nd U.S.A.F. Hospital	2693rd ARC	Fort Worth, Texas
619th U.S.A.F. Hospital	2609th ARC	Boston
620th U.S.A.F. Hospital	2698th ARC	Tampa, Fla.
628th U.S.A.F. Hospital	2611th ARC	Baltimore
631st U.S.A.F. Hospital	2643rd ARC	San Francisco
625th U.S.A.F. Hospital	2658th ARC	Indianapolis

For training purposes, these units are one-bed hospitals which are located at various Air Reserve Centers or Air Reserve Flying Centers. Training at these medical units will include an individual specialty program, designed to qualify personnel for duty performance in specific medical fields. The range of grades is wide and will be appropriate to the responsibility involved. These vary according to the size of the various units. Individuals assigned to these units will be authorized 48 training periods plus a 15-day active duty tour during each year. These medical units will provide refresher, continuation, and qualification training for officers and airmen who have had prior service as well as basic military and technical training for non-prior-service personnel under the six-month training program for enlistees between 17 and 18½ years.

The missions of these newly activated units are to train Air Force Reserve medical units and individuals to a degree of readiness as rapidly as possible, thereby augmenting the capability of the Air Force Medical Service in the event of mobilization. This is only one portion of the program of expanded training opportunities which is being developed by Continental Air Command, the major air command charged with the responsibility of administering all Air Force Reserve forces. Other medical units which will offer training opportunities will soon appear in the program and will complete the medical support picture. Individuals who feel that they may be eligible, and who desire to become part of this new Air Force Reserve training opportunity, may contact their nearest Air Reserve Center in order to obtain detailed information as may concern them specifically.

MEDICINE AND THE LAW

OPINION SURVEY ON MEDICAL PROFESSIONAL LIABILITY

This is the 14th in a series of articles dealing with medical professional liability. An editorial (page 360) and a chronological résumé (page 364) appeared in THE JOURNAL, *Feb. 2. The preceding articles in this series have been published weekly in* THE JOURNAL *from Feb. 9, 1957, to April 6, and since then intermittently.*—ED.

Are professional liability claims against physicians becoming more frequent? Are medical society claims prevention programs effective? Is the cost of professional liability insurance excessive?

To obtain the opinions of physicians on these and many similar questions, the Law Department sent a questionnaire to a random sampling of 7,577 of the A. M. A.'s members, excluding those in the armed forces. A total of 5,341 questionnaires were completed and returned, accounting for 71.2% of the sampling.

As a means of testing the reliability of the sample selection, the number of questionnaires returned from each state was compared with the number of physicians in the state. A close correlation was found. Overall, the results of the survey reflect the opinions of almost 3.5% of the physicians, in each state, most of whom were engaged in active private practice. The principal types of medical practice were fairly represented.

The survey questions were prepared by the Law Department with the assistance of the Council on Medical Service and the Bureau of Medical Economic Research. The pattern of the random sample was devised by the Bureau of Medical Economic Research in accordance with the techniques which have been used successfully in national public opinion polls. It is hoped that the results of this survey together with the other material which has been developed as a result of our over-all study of medical professional liability will lead to a crystallization of the social, legal, and medical issues involved and will provide a sound basis upon which to formulate a national program of medical accident and claims prevention.

It is evident in presenting this information that in a few instances it may lend comfort to some critics of the medical profession. However, in view of the need for isolating and dealing with the problems of medical professional liability, it is believed that a frank presentation of facts and opinions regarding the subject will ultimately produce beneficial results.

TABLE 1.—*"An increasing tendency for patients to file claims of malpractice against physicians has been alleged. We do not know whether this is fact or fiction. Would you say that, in the last five years, the malpractice claims in your community have: decreased . . . remained the same . . . increased . . . no opinion . . ."*

	Decreased		Remained the Same		Increased		No Opinion		
	No.	%	No.	%	No.	%	No.	%	Total
Alabama	5	15.1	25	75.8	2	6.1	1	3.0	33
Arizona	5	16.1	12	38.7	11	35.5	3	9.7	31
Arkansas	2	4.9	20	48.8	11	26.8	8	19.5	41
California	29	4.9	117	20.0	350	59.7	90	15.4	586
Colorado	5	6.7	31	41.3	16	21.3	23	30.7	75
Connecticut	2	2.7	26	35.1	25	33.8	21	28.4	74
Delaware	...	...	11	47.8	7	30.4	5	21.8	23
Florida	7	5.7	41	33.6	44	36.1	30	24.6	122
Georgia	3	3.0	46	46.5	29	29.3	21	21.2	99
Idaho	2	6.5	15	48.4	13	41.9	1	3.2	31
Illinois	15	4.4	133	39.2	63	18.6	128	37.8	339
Indiana	16	10.1	85	53.4	23	14.5	35	22.0	159
Iowa	5	4.9	60	58.2	31	30.1	7	6.8	103
Kansas	4	6.4	35	55.6	12	19.0	12	19.0	63
Kentucky	3	5.7	26	49.0	6	11.3	18	34.0	53
Louisiana	2	3.4	12	20.3	37	62.7	8	13.6	59
Maine	1	4.2	12	50.0	5	20.8	6	25.0	24
Maryland	2	2.7	25	33.3	30	40.0	18	24.0	75
Massachusetts	8	5.2	66	43.1	35	22.9	44	28.8	153
Michigan	14	6.8	101	49.3	29	14.1	61	29.8	205
Minnesota	8	6.7	57	47.9	24	20.2	30	25.2	119
Mississippi	2	4.2	28	59.6	14	29.8	3	6.4	47
Missouri	13	10.5	51	41.1	29	23.4	31	25.0	124
Montana	1	3.3	13	43.4	10	33.3	6	20.0	30
Nebraska	9	18.0	27	54.0	7	14.0	7	14.0	50
Nevada	2	33.3	1	16.7	2	33.3	1	16.7	6
New Hampshire	1	4.8	16	76.2	2	9.5	2	9.5	21
New Jersey	6	2.5	73	30.5	76	31.8	84	35.2	239
New Mexico	4	18.2	12	54.6	5	22.7	1	4.5	22
New York	9	1.8	98	19.1	234	45.7	171	33.4	512
North Carolina	8	8.2	57	58.2	11	11.2	22	22.4	98
North Dakota	1	5.0	13	65.0	2	10.0	4	20.0	20
Ohio	24	7.9	137	45.4	51	16.9	90	29.8	302
Oklahoma	3	5.0	32	53.4	20	33.3	5	8.3	60
Oregon	3	5.3	21	36.8	12	21.1	21	36.8	57
Pennsylvania	29	8.1	167	46.7	37	10.3	125	34.9	358
Rhode Island	...	...	5	25.0	10	50.0	5	25.0	20
South Carolina	1	3.0	22	66.7	6	18.2	4	12.1	33
South Dakota	1	10.0	7	70.0	2	20.0	...	...	10
Tennessee	2	2.4	44	52.4	26	30.9	12	14.3	84
Texas	13	5.5	116	48.7	38	16.0	71	29.8	238
Utah	1	5.9	2	11.7	13	76.5	1	5.9	17
Vermont	2	11.1	12	66.7	3	16.7	1	5.5	18
Virginia	2	3.2	27	42.8	19	30.2	15	23.8	63
Washington	3	2.8	32	30.2	42	39.6	29	27.4	106
West Virginia	5	9.3	36	66.7	10	18.5	3	5.5	54
Wisconsin	9	7.8	60	52.2	24	20.9	22	19.1	115
Wyoming	2	13.3	10	66.7	3	20.0	...	...	15
Dist. of Columbia	...	...	4	9.8	31	75.6	6	14.6	41
United States	294	5.6	2,079	39.8	1,542	29.5	1,312	25.1	5,227
Hawaii	...	...	1	5.0	18	90.0	1	5.0	20
Alaska	...	...	1	33.3	1	33.3	1	33.3	3
Grand total	294	5.6	2,081	39.7	1,561	29.7	1,314	25.0	5,250

Are Malpractice Claims Becoming More Frequent?

Many persons have been concerned over an alleged "alarming" increase in the frequency of medical professional liability claims. Although the individual physician may not be in a position to supply authoritative information as to whether there has been such an increase, it is interesting to note that, in response to this question, 39.7% of the respondents were of the opinion that the incidence of claims has not increased in the past five years; 29.7% were of the opinion that there had been an increase; 5.6% thought that there had been a decrease; and 25% had no opinion.

The statistics in this regard are not sufficiently conclusive upon which to base a finding nationally that claims are becoming more frequent. However, in California, Louisiana, New York, Rhode Island, Utah, the District of Columbia, and Hawaii there was a clear-cut expression of opinion that professional liability claims have increased in frequency during the past five years (table 1).

It is realized that a more reliable means of determining the trend in the frequency of professional liability claims would be an analysis of the records of the insurance industry. Contacts have been and are being made with the key insurance companies writing this type of coverage in an effort to obtain such data.

Are Medical Society Professional Liability Programs Worthwhile?

The majority of the physicians in every state who responded expressed the opinion that the malpractice claims prevention programs of medical organizations are of "some" or "considerable" value (table 2). The percentage tabulations as to the usefulness of such programs are as follows: "a waste of time," 3.3%; "of doubtful value," 11.5%; "of some value," 35.9%; "of considerable value," 38.0%; "no opinion," 11.3%.

Which Society Should Conduct Claims Prevention Programs?

"If such claims prevention programs *are* instituted, which society or societies should conduct them?" Of those expressing an opinion, 45.2% believe that professional liability claims prevention programs should be conducted exclusively by county medical societies, and 28.3% are of the opinion that the state medical societies alone should conduct such programs. Twelve and one-half per cent believe that claims prevention programs should be conducted at both the state and county society levels. Only 4% preferred the specialty society exclusively. The remaining respondents (10%) named bar associations, universities, hospitals, and insurance companies, as well as state, county, and specialty societies, as proper participants in professional liability claims prevention programs (table 3).

What Subjects Should Be Stressed in Professional Liability Programs?

The question was asked in the survey as to what subjects, in the opinion of the respondent, should be stressed in a professional liability claims prevention program. The replies do not fall into any particular pattern which would make them susceptible to detailed tabulation, nor do the replies seem to vary significantly with geographical area. The following subjects were most frequently mentioned by respondents:

1. Educating the physicians in the subject of law as applied to the practice of medicine.
2. The promotion of better physician-patient relations, particularly with regard to fees.
3. Cautioning physicians to avoid criticizing other physicians or the treatment rendered by others.

TABLE 2.—*"What is your opinion as to the usefulness of educational malpractice claims prevention programs by medical organizations—are they: a waste of time. . . . of doubtful value. . . . of some value. . . . of considerable value. . . . no opinion. . . ."*

	A Waste of Time		Of Doubtful Value		Of Some Value		Of Considerable Value		No Opinion		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	
Alabama	3	9.1	2	6.0	13	39.4	9	27.3	6	18.2	33
Arizona	...	...	2	6.4	11	35.5	15	48.4	3	9.7	31
Arkansas	1	2.5	4	10.0	16	40.0	11	27.5	8	20.0	40
California	16	2.7	46	7.8	196	33.4	303	51.5	27	4.6	588
Colorado	2	2.6	8	10.5	24	31.6	35	46.1	7	9.2	76
Connecticut	2	2.7	9	12.2	16	21.6	37	50.0	10	13.5	74
Delaware	...	...	3	13.0	8	34.8	10	43.5	2	8.7	23
Florida	3	2.5	12	9.8	47	38.5	53	43.5	7	5.7	122
Georgia	2	2.0	10	10.1	37	37.4	36	36.4	14	14.1	99
Idaho	...	...	2	6.4	11	35.5	15	48.4	3	9.7	31
Illinois	15	4.5	37	11.1	131	39.1	113	33.7	39	11.6	335
Indiana	3	1.9	33	20.9	62	39.2	43	27.2	17	10.8	158
Iowa	9	8.8	14	13.7	30	29.4	33	32.4	16	15.7	102
Kansas	1	1.6	8	12.7	17	27.0	24	38.1	13	20.6	63
Kentucky	1	1.9	7	13.2	20	37.7	18	34.0	7	13.2	53
Louisiana	...	...	8	13.6	20	33.9	22	37.3	9	15.2	59
Maine	2	8.3	1	4.2	8	33.3	11	45.9	2	8.3	24
Maryland	3	4.1	9	12.2	28	37.8	24	32.4	10	13.5	74
Massachusetts	4	2.6	19	12.2	68	43.9	42	27.1	22	14.2	155
Michigan	3	1.5	21	10.1	71	34.3	84	40.6	28	13.5	207
Minnesota	1	0.8	14	11.7	46	38.3	45	37.5	14	11.7	120
Mississippi	2	4.2	3	6.4	21	44.7	14	29.8	7	14.9	47
Missouri	7	5.6	17	13.6	46	36.8	33	26.4	22	17.6	125
Montana	...	...	2	6.7	11	36.7	14	46.6	3	10.0	30
Nebraska	2	4.0	8	16.0	18	36.0	19	38.0	3	6.0	50
Nevada	...	...	...	...	2	33.3	4	66.7	...	...	6
New Hampshire	...	...	2	9.5	6	28.6	12	57.1	1	4.8	21
New Jersey	7	2.9	28	11.7	89	37.2	85	35.6	30	12.6	239
New Mexico	1	4.4	2	8.7	9	39.1	6	26.1	5	21.7	23
New York	23	4.5	62	12.1	202	39.3	175	34.0	52	10.1	514
North Carolina	3	3.0	16	16.2	41	41.4	28	28.3	11	11.1	99
North Dakota	...	...	3	15.0	6	30.0	8	40.0	3	15.0	20
Ohio	8	2.7	45	14.9	110	36.4	106	35.1	33	10.9	302
Oklahoma	2	3.3	1	1.7	23	38.3	29	48.4	5	8.3	60
Oregon	...	...	9	15.8	15	26.3	27	47.4	6	10.5	57
Pennsylvania	17	4.7	48	13.3	121	33.6	129	35.9	45	12.5	360
Rhode Island	1	4.8	6	28.6	4	19.0	8	38.1	2	9.5	21
South Carolina	...	...	4	12.5	12	37.5	10	31.2	6	18.8	32
South Dakota	1	10.0	2	20.0	3	30.0	3	30.0	1	10.0	10
Tennessee	5	6.0	11	13.3	35	42.2	22	26.5	10	12.0	83
Texas	9	3.8	26	10.9	76	31.9	100	42.0	27	11.4	238
Utah	...	...	1	5.9	7	41.2	7	41.2	2	11.7	17
Vermont	...	...	3	16.7	7	38.9	6	33.3	2	11.1	18
Virginia	3	4.7	7	10.9	15	23.4	30	46.9	9	14.1	64
Washington	1	0.9	9	8.5	34	32.1	49	46.2	13	12.3	106
West Virginia	4	7.3	5	9.1	23	41.8	19	34.5	4	7.3	55
Wisconsin	3	2.6	12	10.6	42	37.2	41	36.3	15	13.3	113
Wyoming	...	...	1	6.7	2	13.3	8	53.3	4	26.7	15
Dist. of Columbia	1	2.4	5	12.2	17	41.5	15	36.6	3	7.3	41
United States	171	3.3	607	11.6	1,877	35.9	1,960	38.0	588	11.2	5,233
Hawaii	1	5.0	...	...	9	45.0	7	35.0	3	15.0	20
Alaska	...	...	...	...	1	33.3	1	33.3	1	33.3	3
Grand total	172	3.3	607	11.5	1,887	35.9	1,968	38.0	592	11.3	5,256

4. Educating the physician with reference to his ethical responsibilities in medical practice.

5. The maintenance of adequate records.

TABLE 3.—*"If such claims prevention programs are instituted, which society or societies should conduct them? (check one or more) County medical society. . . . State medical society. . . . A specialty society. . . . Other _____"*
specify

	County Medical Society	State Medical Society	A Specialty Society	Other*	County and State Societies
Alabama	15	9	...	1	3
Arizona	13	6	1	...	5
Arkansas	9	19	...	1	7
California	339	67	14	11	79
Colorado	24	33	1	2	12
Connecticut	32	24	2	1	7
Delaware	10	7	...	1	3
Florida	58	21	3	4	22
Georgia	38	31	2	5	16
Idaho	12	11	...	...	7
Illinois	124	93	17	12	32
Indiana	63	57	7	3	18
Iowa	23	48	4	4	12
Kansas	22	29	3	1	7
Kentucky	25	17	4	...	5
Louisiana	19	18	3	3	10
Maine	12	6	2	...	...
Maryland	18	36	5	4	7
Massachusetts	37	78	8	5	11
Michigan	93	52	7	4	24
Minnesota	47	39	2	2	17
Mississippi	14	17	3	1	9
Missouri	57	36	7	5	10
Montana	8	11	...	...	8
Nebraska	15	22	3	1	7
Nevada	3	...	...	...	2
New Hampshire	3	13	1	1	1
New Jersey	113	57	15	7	24
New Mexico	9	5	...	1	6
New York	278	79	30	4	57
North Carolina	36	40	4	1	16
North Dakota	1	9	3	...	3
Ohio	141	89	11	9	29
Oklahoma	19	22	2	2	7
Oregon	24	19	...	1	6
Pennsylvania	191	71	16	7	32
Rhode Island	4	12	...	...	3
South Carolina	20	7	...	...	3
South Dakota	3	4	1	1	...
Tennessee	33	22	1	1	15
Texas	108	61	6	4	31
Utah	5	3	1	1	4
Vermont	4	10	...	...	2
Virginia	20	19	2	1	16
Washington	48	26	3	2	16
West Virginia	28	14	3	1	4
Wisconsin	41	41	6	4	11
Wyoming	3	10	...	...	1
Dist. of Columbia	21	8	3	...	4
United States	2,283	1,428	206	119	631
Hawaii	15	3	...	...	2
Alaska	...	3	...	...	...
Grand total	2,298	1,434	206	119	633

* Other includes: 16 other, unspecified; 10 bar association; 8 insurance company; 64 A.M.A.; and 22 hospitals and universities.

"Is a Claims Prevention Program Offered by Your County Society?"

Although 73.9% of the respondents (table 2) consider professional liability claims prevention programs as useful, 76.4% of all respondents reported that such a program is not offered by their county medical society (table 4).

In asking physicians whether their county society offered "a claims prevention program," no attempt was made to define what constitutes such a program. Consequently, members of the same county medical society might supply different answers. To one member, periodic meetings devoted to the discussion of professional liability might constitute a claims prevention program. Another member may consider nothing short of an active professional liability claims prevention committee to be a "program."

The physicians who reported that their county societies have claims prevention programs rated these programs as follows: "harmful," 1.3%; "ineffectual," 15.8%; "adequate," 58.5%; "excellent," 17.6%; and no opinion or no answer, 6.8%.

"Is a Claims Prevention Program Offered by Your State Society?"

This question was included as a means of testing the extent to which members are aware of their state professional liability programs.

Although the executive secretaries of the following 17 state medical societies reported in connection with another phase of this professional liability survey that their states offered a claims prevention program, a majority of the physicians responding from their states stated that no program was offered: California (52.2%), Connecticut (80.4%), Georgia (71.2%), Kansas (82.5%), Minnesota (60.7%), Missouri (95.9%), New Hampshire (65%), New Jersey (88.8%), New York (75.1%), North Carolina (75.3%), Oklahoma (60.8%), South Dakota (88.9%), Utah (56.2%), Virginia (77.6%), Washington (73.4%), West Virginia (87.2%), and Wyoming (71.4%) (table 5).

The answers to this question would indicate that the programs in effect in most of the states are either inadequate or not sufficiently publicized. The expression of interest by physicians in having such programs suggests that greater emphasis in their initiation and implementation is needed at both the state and county level.

Claims Review Committees

Regarding the value of medical society committees for the review of professional liability claims, those expressing an opinion (table 6) consider such programs: "a waste of time," 2.1%; "of doubtful value," 6.0%; "of some value," 27.9%; "of considerable value," 52.5%; and no opinion, 11.5%.

Which Society Should Conduct Claims Review Programs?

"If claims review programs *are* initiated, which society or societies should conduct them?" Of those expressing an opinion, 58.6% believe that professional liability claims review programs should be conducted exclusively by county medical societies, and 20.5% are of the opinion that the state societies alone should conduct them. Eleven and one-half per cent believe that claims review programs should be conducted at both the state and county society levels. The remaining 9.4% suggested that bar associations, insurance companies, specialty societies and the American Medical Association should conduct such programs (table 7).

"Is a Claims Review Program Offered by Your County Society?"

Of those responding to this question, 60.2% reported that their county medical society did not offer a claims review program (table 8). The 39.8% who reported that such a program was offered by their county medi-

TABLE 4.—*"Is a claims prevention program now offered by your county medical society? Yes. . . . No. . . . If 'Yes,' how do you rate this program? Harmful. . . . Ineffectual. . . . Adequate. . . . Excellent. . . ."*

	Program Offered				Program Rating				
	Yes		No						No Opinion and No Answer
	Number	Per Cent	Number	Per Cent	Harmful	Ineffectual	Adequate	Excellent	
Alabama	3	9.7	28	90.3		1	2	...	
Arizona	6	19.4	25	80.6		...	4	2	
Arkansas	5	13.2	33	86.8		1	2	2	
California	403	73.4	146	26.6	3	61	230	98	21
Colorado	21	32.3	44	67.7	1	4	9	5	2
Connecticut	18	29.0	44	71.0		4	11	2	1
Delaware	1	5.3	18	94.7		1	...	...	
Florida	33	28.0	85	72.0		6	19	2	6
Georgia	16	17.4	76	82.6	1	2	17	4	2
Idaho	8	25.8	23	74.2		...	6	2	
Illinois	30	10.6	254	89.4	2	7	17	3	1
Indiana	12	8.2	135	91.8		3	7	2	
Iowa	11	10.8	91	89.2	1	...	9	1	
Kansas	7	11.7	53	88.3		...	5	1	1
Kentucky	8	15.7	43	84.3		1	5	1	1
Louisiana	14	28.6	35	71.4		5	7	2	
Maine	5	21.7	18	78.3		2	2	1	
Maryland	9	14.1	55	85.9		2	5	1	1
Massachusetts	8	6.0	125	94.0		1	4	3	
Michigan	26	13.7	164	86.3		5	18	1	2
Minnesota	22	20.6	85	79.4		1	13	3	5
Mississippi	6	13.0	40	87.0		3	2	1	
Missouri	7	6.0	109	94.0	1	1	4	1	
Montana	7	24.1	22	75.9		2	5	...	
Nebraska	11	23.4	36	76.6		...	8	3	
Nevada	...	...	5	100.0		...	...	...	
New Hampshire	2	10.5	17	89.5		...	...	2	
New Jersey	25	11.5	192	88.5		3	15	5	2
New Mexico	2	10.0	18	90.0		...	1	1	
New York	124	28.7	308	71.3	1	25	71	14	13
North Carolina	7	7.3	89	92.7		...	4	2	1
North Dakota	...	...	19	100.0		...	...	...	
Ohio	32	11.4	248	88.6	2	5	19	6	
Oklahoma	16	28.1	41	71.9		2	12	2	
Oregon	11	21.6	40	78.4		...	9	1	1
Pennsylvania	53	17.5	249	82.5	1	10	35	3	4
Rhode Island	5	27.8	13	72.2			3	2	
South Carolina	3	9.1	30	90.9			2	1	
South Dakota	1	10.0	9	90.0			1	...	
Tennessee	21	26.6	58	73.4	2	2	13	3	1
Texas	36	17.1	174	82.9		5	22	6	3
Utah	10	62.5	6	37.5			10	...	
Vermont	...	...	17	100.0			...	...	
Virginia	7	12.7	48	87.3			6	1	
Washington	34	34.3	65	65.7		7	19	3	5
West Virginia	10	18.5	44	81.5		2	7	...	1
Wisconsin	15	14.0	92	86.0		3	8	4	
Wyoming	1	7.1	13	92.9			1	...	
Dist. of Columbia	...	...	...	...			...	...	
United States	1,112	23.7	3,582	76.3	15	177	649	197	74
Hawaii	5	26.3	14	73.7		...	4	...	1
Alaska	...	...	1	100.0		...	...	...	...
Grand total	1,117	23.7	3,597	76.3	15 (1.3%)	177 (15.8%)	653 (58.5%)	197 (17.6%)	75 (6.8%)

TABLE 5.—*"Is a claims prevention program now offered by your state society? Yes. . . . No. . . . If 'Yes' above, how do you rate this program? Harmful. . . . Ineffectual. . . . Adequate. . . . Excellent. . . ."*

	Program Offered				Program Rating				
	Yes		No						
	Number	Per Cent	Number	Per Cent	Harmful	Ineffectual	Adequate	Excellent	No Opinion and No Answer
Alabama	3	10.7	25	89.3		1	1	1	
Arizona	6	20.7	23	79.3		...	4	2	
Arkansas	6	18.8	26	81.2		2	2	2	
California	197	47.8	215	52.2	3	48	100	23	23
Colorado	47	78.3	13	21.7		3	31	9	4
Connecticut	10	19.6	41	80.4		4	4	...	2
Delaware	5	23.8	16	76.2		...	3	...	2
Florida	19	19.6	78	80.4		5	11	1	2
Georgia	23	28.8	57	71.2		5	8	6	4
Idaho	16	55.2	13	44.8		5	8	2	1
Illinois	27	11.9	200	88.1		5	10	5	7
Indiana	24	19.5	99	80.5		4	15	2	3
Iowa	24	24.2	75	75.8	1	4	14	5	
Kansas	10	17.5	47	82.5		1	8	1	
Kentucky	12	27.3	32	72.7		...	7	1	4
Louisiana	16	39.0	25	61.0		3	10	2	1
Maine	3	15.8	16	84.2		2	1	...	
Maryland	12	21.4	44	78.6		1	6	2	3
Massachusetts	15	12.3	107	87.7		3	7	4	1
Michigan	16	10.9	131	89.1		6	7	...	3
Minnesota	35	39.3	54	60.7		10	16	2	7
Mississippi	11	26.8	30	73.2	1	2	4	1	3
Missouri	4	4.1	93	95.9		1	1	2	
Montana	17	63.0	10	37.0	1	6	7	1	2
Nebraska	15	36.6	26	63.4		4	7	2	2
Nevada	...	...	5	100.0		...	...	...	
New Hampshire	7	35.0	13	65.0		1	1	5	
New Jersey	20	11.2	159	88.8		6	7	2	5
New Mexico	2	11.1	16	88.9		...	...	1	1
New York	86	24.9	260	75.1	1	29	45	2	9
North Carolina	19	24.7	58	75.3		2	10	...	7
North Dakota	2	11.8	15	88.2		...	1	...	1
Ohio	16	7.8	188	92.2	1	5	7	...	3
Oklahoma	20	39.2	31	60.8		3	13	4	
Oregon	13	29.5	31	70.5		3	7	3	
Pennsylvania	32	14.0	196	86.0	1	5	17	4	5
Rhode Island	14	66.7	7	33.3		1	11	2	
South Carolina	6	19.4	25	80.6		1	4	1	
South Dakota	1	11.1	8	88.9		1	...	...	
Tennessee	10	15.2	56	84.8		2	5	1	2
Texas	60	34.1	116	65.9		13	33	11	3
Utah	7	43.8	9	56.2		...	6	...	1
Vermont	2	11.8	15	88.2		2	...	...	
Virginia	11	22.4	38	77.6		...	7	2	2
Washington	21	26.6	58	73.4		6	10	2	3
West Virginia	6	12.8	41	87.2		2	3	1	
Wisconsin	18	20.0	72	80.0		4	8	4	2
Wyoming	4	28.6	10	71.4		...	4	...	
Dist. of Columbia	21	60.0	14	40.0	1	2	12	2	4
United States	971	24.8	2,937	75.2	10 (1.0%)	213 (21.9%)	503 (51.8%)	123 (12.7%)	122 (12.6%)
Hawaii	...	...	20	100.0					
Alaska	...	...	3	100.0					
Grand total	971	24.7	2,960	75.3					

TABLE 6.—*"Some medical organizations have created committees or other bodies before which claims are brought for an official review. Do you believe that such a claims review program is: a waste of time. . . . of doubtful value. . . . of some value. . . . of considerable value. . . . no opinion. . . ."*

	A Waste of Time		Of Doubtful Value		Of Some Value		Of Considerable Value		No Opinion and No Answer		
	No.	%	No.	%	No.	%	No.	%	No.	%	Total
Alabama	...	...	1	3.0	8	24.2	19	57.6	5	15.2	33
Arizona	...	...	...	...	10	31.3	20	62.5	2	6.2	32
Arkansas	1	2.4	2	4.9	15	36.6	17	41.5	6	14.6	41
California	10	1.7	19	3.2	129	21.8	404	68.2	30	5.1	592
Colorado	3	3.9	2	2.6	11	14.3	50	64.9	11	14.3	77
Connecticut	...	...	3	4.1	10	13.5	55	74.3	6	8.1	74
Delaware	...	...	1	4.4	7	30.4	11	47.8	4	17.4	23
Florida	5	4.1	1	0.8	39	31.7	74	60.2	4	3.2	123
Georgia	4	4.0	8	8.0	21	21.0	53	53.0	14	14.0	100
Idaho	...	...	2	6.4	7	22.6	22	71.0	...	...	31
Illinois	7	2.1	31	9.1	119	35.0	144	42.3	39	11.5	340
Indiana	4	2.5	15	9.4	54	33.7	53	33.1	34	21.3	160
Iowa	1	1.0	3	2.9	35	34.0	54	52.4	10	9.7	103
Kansas	4	6.3	3	4.7	23	35.9	27	42.2	7	10.9	64
Kentucky	...	...	1	1.9	17	32.1	29	54.7	6	11.3	53
Louisiana	1	1.7	6	10.2	16	27.1	29	49.1	7	11.9	59
Maine	...	...	2	8.3	5	20.9	15	62.5	2	8.3	24
Maryland	1	1.3	2	2.7	18	24.0	42	56.0	12	16.0	75
Massachusetts	3	1.9	14	9.0	33	21.3	77	49.7	28	18.1	155
Michigan	4	1.9	11	5.3	60	29.0	108	52.2	24	11.6	207
Minnesota	1	0.8	6	5.0	33	27.3	65	53.7	16	13.2	121
Mississippi	3	6.4	2	4.2	17	36.2	22	46.8	3	6.4	47
Missouri	3	2.4	11	8.8	39	31.2	52	41.6	20	16.0	125
Montana	...	...	...	...	8	26.7	20	66.6	2	6.7	30
Nebraska	1	2.0	2	4.0	11	22.0	30	60.0	6	12.0	50
Nevada	...	...	...	...	2	33.3	4	66.7	...	...	6
New Hampshire	...	...	...	...	2	9.5	17	81.0	2	9.5	21
New Jersey	5	2.1	15	6.2	77	32.1	117	48.8	26	10.8	240
New Mexico	...	...	2	8.7	6	26.1	13	56.5	2	8.7	23
New York	8	1.6	31	6.0	167	32.2	254	49.0	58	11.2	518
North Carolina	2	2.0	6	6.0	28	28.0	49	49.0	15	15.0	100
North Dakota	...	...	1	5.0	8	40.0	8	40.0	3	15.0	20
Ohio	4	1.3	26	8.5	89	29.3	147	48.4	38	12.5	304
Oklahoma	1	1.7	6	10.0	16	26.7	31	51.6	6	10.0	60
Oregon	1	1.8	3	5.3	10	17.5	38	66.6	5	8.8	57
Pennsylvania	8	2.2	26	7.2	113	31.2	167	46.1	48	13.3	362
Rhode Island	1	4.5	...	...	6	27.3	13	59.1	2	9.1	22
South Carolina	1	3.0	3	9.1	12	36.4	12	36.4	5	15.1	33
South Dakota	...	...	4	40.0	2	20.0	4	40.0	...	...	10
Tennessee	2	2.4	5	5.9	25	29.8	45	53.6	7	8.3	84
Texas	7	2.9	23	9.7	60	25.2	118	49.6	30	12.6	238
Utah	1	5.9	...	...	...	...	16	94.1	...	...	17
Vermont	...	...	...	...	4	22.2	12	66.7	2	11.1	18
Virginia	6	9.2	3	4.6	20	30.8	26	40.0	10	15.4	65
Washington	2	1.9	4	3.7	20	18.7	64	59.8	17	15.9	107
West Virginia	2	3.6	4	7.3	17	30.9	30	54.6	2	3.6	55
Wisconsin	2	1.7	7	6.0	29	25.0	53	45.7	25	21.6	116
Wyoming	1	6.7	...	...	4	26.6	9	60.0	1	6.7	15
Dist. of Columbia	3	7.3	1	2.4	9	22.0	27	65.9	1	2.4	41
United States	113	2.1	318	6.0	1,471	27.9	2,766	52.5	603	11.5	5,271
Hawaii	...	...	...	...	4	20.0	13	65.0	3	15.0	20
Alaska	...	...	...	...	...	...	2	66.7	1	33.3	3
Grand total	113	2.1	318	6.0	1,475	27.9	2,781	52.5	607	11.5	5,294

cal society rated these programs as follows: "harmful," 0.8%; "ineffectual," 9.7%; "adequate," 58.3%; "excellent," 23.1%; and no opinion or no answer, 8.1%.

"Is a Claims Review Program Offered by Your State Society?"

Numerous respondents answered that such a program was offered in states where state society representatives had previously indicated that such programs were not in effect. On the other hand, more than a majority of the physicians responding in the following states said that no claims review program is offered by the state medical society whereas state society officials previously indicated the existence of such a program: Arizona, California, Georgia, Kansas, Kentucky, Maryland, Massachusetts, Mississippi, Missouri, New Jersey, New York, North Carolina, Pennsylvania, South Dakota, Tennessee, Virginia, Washington, West Virginia, and Wyoming (table 9). The conclusion seems warranted that there is a need for more publicity regarding claims review programs among state society members.

Responsibility for Medical Negligence

The charge has been made that physicians believe that they should be immune from responsibility for injury resulting from negligent medical practice. Ninety-five and one-tenth per cent of those responding to the question believe that physicians should not be immune from liability for a patient's injury resulting from the physician's negligent practice of medicine.

Significantly, there was little variation in the opinions expressed by the respondents in the various states.

Group Professional Liability Insurance

Eighty-five and nine-tenths per cent of those physicians responding to the question on group insurance coverage expressed the belief that making professional liability policies available on a group basis is a proper function of medical societies. Of those who consider the offering of group professional liability insurance a proper medical society function, 30.9% believe that such insurance should be offered exclusively by county medical societies and 34.5% are of the opinion that the state societies alone should offer such coverage. Eleven and three-tenths per cent believe that group insurance should be offered by both county and state societies. The remainder of the respondents believe that professional liability on a group basis should be offered exclusively by specialty societies or by specialty and other medical societies concurrently.

In the interest of a fair analysis of the answers to this question it should be pointed out that the term "group insurance" was not defined on the questionnaire. It is therefore quite probable that it was interpreted in a number of ways by those answering. In any event the high percentage of affirmative answers indicates a desire on the part of those responding for a collective type of insurance program in preference to the purchasing of professional liability insurance on an individual basis.

Professional Liability Insurance

On the basis of the survey, 92.3% of all physicians are covered by some form of professional liability insurance. However, it would appear that in a number of states 1 out of 5, or 20% of physicians, are without professional liability insurance, as for example in Alabama, Arkansas, Colorado, Delaware, Georgia, Maryland, and Mississippi. Ninety-two and three-fifths per cent of the physicians responding said they had no difficulty in obtaining insurance, 6.6% reported that professional liability insurance was "somewhat" difficult to obtain, and 0.8% said "very" difficult (table 10).

TABLE 7.—*"If claims review programs are initiated, which society or societies should conduct them? County medical society. . . . State medical society. . . . A specialty society. . . . Other _____ (Check one or more)"*
specify

	County Medical Society	State Medical Society	A Specialty Society	Other*	County and State Societies
Alabama	20	8	...		3
Arizona	15	5	1		7
Arkansas	10	19	...	1	7
California	437	29	23	2	48
Colorado	16	42	...	1	9
Connecticut	39	16	...	1	10
Delaware	11	5	...		5
Florida	87	8	3		15
Georgia	56	16	5		14
Idaho	10	10	...		10
Illinois	186	51	19	6	26
Indiana	81	36	4		25
Iowa	27	54	3		13
Kansas	27	25	...		8
Kentucky	31	12	3		6
Louisiana	23	13	4		10
Maine	11	9	1		1
Maryland	24	25	8	1	8
Massachusetts	38	64	12	1	16
Michigan	132	26	9	2	18
Minnesota	53	41	...		18
Mississippi	21	15	1		9
Missouri	71	28	6	1	8
Montana	9	11	...		7
Nebraska	15	17	2		12
Nevada	2	...	...		4
New Hampshire	3	12	1		2
New Jersey	136	36	15	3	23
New Mexico	9	7	...		6
New York	353	40	34		41
North Carolina	49	34	2		8
North Dakota	7	6	3		1
Ohio	205	45	9		20
Oklahoma	22	28	...		5
Oregon	25	19	1		8
Pennsylvania	237	42	12	3	35
Rhode Island	5	9	...		5
South Carolina	19	9	...		2
South Dakota	2	6	1		1
Tennessee	51	14	3		10
Texas	144	35	5		29
Utah	6	5	...		5
Vermont	6	9	...		2
Virginia	28	12	...		12
Washington	60	14	3		14
West Virginia	33	9	3		6
Wisconsin	42	35	5		17
Wyoming	6	7	...		2
Dist. of Columbia	24	8	2		2
United States	2,924	1,024	203	22	573
Hawaii	16	3	...		...
Alaska		2	...		...
Grand total	2,940	1,029	203	22	573

* Other includes: 5 other, unspecified; 2 bar association; 5 insurance company; 6 A. M. A.; and 4 hospitals.

Ninety-four and three-tenths per cent reported that they did not have to purchase other types of insurance from the underwriter or the agent in order to obtain professional liability insurance. Five and one-tenths per cent said they were required to purchase "some" of their other insurance, and 0.6% said that "all" of their insurance had to be purchased from the same

TABLE 8.—*"Is a claims review program now offered by your county medical society? Yes. . . . No. . . . If 'Yes' above, how do you rate this program? Harmful. . . . Ineffectual. . . . Adequate. . . . Excellent. . . ."*

	Program Offered				Program Rating				
	Yes		No						
	Number	Per Cent	Number	Per Cent	Harmful	Ineffectual	Adequate	Excellent	No Opinion and No Answer
Alabama	8	25.0	24	75.0		1	3	2	2
Arizona	8	27.6	21	72.4		...	4	3	1
Arkansas	5	14.7	29	85.3		...	3	2	...
California	441	86.0	72	14.0	6	28	233	147	27
Colorado	29	44.6	36	55.4	1	5	13	9	1
Connecticut	39	73.6	14	26.4		3	25	8	3
Delaware	6	30.0	14	70.0		1	2	2	1
Florida	54	48.6	57	51.4	1	6	29	10	8
Georgia	34	38.2	55	61.8		2	20	6	6
Idaho	14	46.7	16	53.3		4	6	2	2
Illinois	75	28.3	190	71.7		13	40	15	7
Indiana	39	27.3	104	72.7		5	26	7	1
Iowa	12	12.2	86	87.8		5	6	...	1
Kansas	7	11.5	54	88.5		1	4	1	1
Kentucky	19	38.8	30	61.2		2	12	5	...
Louisiana	22	46.8	25	53.2	1	4	11	3	3
Maine	4	19.0	17	81.0		1	1	1	1
Maryland	17	31.5	37	68.5		1	11	3	2
Massachusetts	17	13.8	106	86.2		...	13	3	1
Michigan	67	37.0	114	63.0		7	47	12	1
Minnesota	29	30.2	67	69.8		2	18	6	3
Mississippi	9	20.5	35	79.5		1	7	1	...
Missouri	26	23.4	85	76.6	1	1	13	6	5
Montana	6	21.4	22	78.6		1	5	...	...
Nebraska	17	36.2	30	63.8		1	10	6	...
Nevada	1	20.0	4	80.0		1	...	...	...
New Hampshire	2	10.5	17	89.5		...	...	2	...
New Jersey	64	31.5	139	68.5		6	36	12	10
New Mexico	3	15.0	17	85.0		...	2	1	...
New York	209	52.8	187	47.2		23	122	40	24
North Carolina	12	13.3	78	86.7		1	9	2	...
North Dakota	3	15.8	16	84.2		1	1	...	1
Ohio	84	30.8	189	69.2		10	50	19	5
Oklahoma	17	30.9	38	69.1		1	11	5	...
Oregon	21	42.9	28	57.1		..	14	6	1
Pennsylvania	92	32.9	188	67.1		8	60	17	7
Rhode Island	11	55.0	9	45.0		1	8	2	...
South Carolina	2	6.7	28	93.3		...	2	...	...
South Dakota	...	...	10	100.0		...	...	...	...
Tennessee	27	35.5	49	64.5	1	3	16	6	1
Texas	81	38.2	131	61.8		7	50	17	7
Utah	11	73.3	4	26.7		...	7	4	...
Vermont	3	17.6	14	82.4		...	2	1	...
Virginia	18	32.7	37	67.3		3	8	4	3
Washington	46	49.5	47	50.5	2	4	31	6	3
West Virginia	21	38.2	34	61.8		3	17	...	1
Wisconsin	27	26.5	75	73.5	1	4	14	5	3
Wyoming	6	42.9	8	57.1		...	6	...	...
Dist. of Columbia	...	...	...	...		...	...	...	...
United States	1,765	39.6	2,687	60.4	14	171	1,028	409	143
Hawaii	11	57.9	8	42.1		1	8	2	...
Grand total	1,776	39.7	2,695	60.3	14 (0.8%)	172 (9.7%)	1,036 (58.3%)	411 (23.1%)	143 (8.1%)

TABLE 9.—*"Is a claims review program now offered by your state medical society? If 'Yes' above, how do you rate this program? Harmful. . . . Ineffectual. . . . Adequate. . . . Excellent. . . ."*

	Program Offered				Program Rating				
	Yes		No						
	Number	Per Cent	Number	Per Cent	Harmful	Ineffectual	Adequate	Excellent	No Opinion and No Answer
Alabama	2	7.1	26	92.9		1	1		
Arizona	8	30.8	18	69.2			6	1	1
Arkansas	12	37.5	20	62.5		5	5	1	1
California	93	29.2	226	70.8	2	13	57	12	9
Colorado	50	87.7	7	12.3	1	1	29	15	4
Connecticut	17	42.5	23	57.5		2	11	1	3
Delaware	5	25.0	15	75.0		1	3	1	
Florida	25	28.1	64	71.9		3	12	3	7
Georgia	19	29.7	45	70.3		1	12	3	3
Idaho	17	60.7	11	39.3		2	7	6	2
Illinois	35	17.1	170	82.9		9	14	4	3
Indiana	40	34.5	76	65.5	1	8	21	5	5
Iowa	43	48.3	46	51.7	1	7	22	10	3
Kansas	12	22.6	41	77.4		1	8	3	
Kentucky	12	30.8	27	69.2		1	6	1	4
Louisiana	17	43.6	22	56.4	1		10	1	5
Maine	6	35.3	11	64.7			2	3	1
Maryland	20	41.7	28	58.3			12	4	4
Massachusetts	37	32.7	76	67.3		3	18	8	8
Michigan	19	14.6	111	85.4		4	12	2	1
Minnesota	44	54.3	37	45.7		2	22	11	9
Mississippi	10	27.0	27	73.0		1	7	1	1
Missouri	5	6.0	79	94.0		2	2	1	
Montana	19	79.2	5	20.8	1		10	6	2
Nebraska	24	61.5	15	38.5			14	6	4
Nevada	...	...	4	100.0			...		
New Hampshire	14	73.7	5	26.3			5	7	2
New Jersey	35	21.2	130	78.8		3	19	7	6
New Mexico	11	55.0	9	45.0			5	5	1
New York	71	25.2	211	74.8		13	38	9	11
North Carolina	14	18.7	61	81.3		1	9		4
North Dakota	4	23.5	13	76.5		1	3		
Ohio	18	9.8	166	90.2		3	11		4
Oklahoma	24	54.5	20	45.5		3	15	2	4
Oregon	24	60.0	16	40.0		3	7	12	2
Pennsylvania	36	18.2	162	81.8		3	23	4	6
Rhode Island	21	100.0	...	...		1	16	3	1
South Carolina	7	23.3	23	76.7			4		3
South Dakota	1	10.0	9	90.0		1	...		
Tennessee	11	19.0	47	81.0		2	5	3	1
Texas	37	24.8	112	75.2		3	25	4	5
Utah	13	81.2	3	18.8		1	8	3	1
Vermont	5	35.7	9	64.3			5		
Virginia	9	20.9	34	79.1			6		3
Washington	34	46.6	39	53.4	2	3	18	6	5
West Virginia	12	25.0	36	75.0		2	6	1	3
Wisconsin	28	32.9	57	67.1		1	15	6	6
Wyoming	6	42.9	8	57.1		1	4		1
Dist. of Columbia	29	85.3	5	14.7		2	15	10	2
United States	1,055	30.5	2,405	69.5	9	114	585	191	156
Hawaii	6	31.6	13	68.4		2	2	2	
Alaska	...	...	3	100.0					
Grand total	1,061	30.5	2,421	69.5	9 (0.9%)	116 (10.9%)	587 (55.3%)	193 (18.2%)	156 (14.7%)

TABLE 10.—*"Do you carry professional liability insurance? Yes. . . . No. . . . Was this insurance difficult to obtain? No. . . . Somewhat. . . . Very. . . ."*

	Insurance Coverage				Difficult to Obtain					
	Yes		No		No		Somewhat		Very	
	Number	Per Cent	Number	Per Cent	No.	%	No.	%	No.	%
Alabama	26	81.2	6	18.8	26	100.0	...	...		
Arizona	31	96.9	1	3.1	22	71.0	8	25.8	1	3.2
Arkansas	33	80.5	8	19.5	30	93.8	2	6.2		
California	563	95.6	26	4.4	525	94.1	30	5.4	3	0.5
Colorado	63	81.8	14	18.2	59	93.7	4	6.3		
Connecticut	67	90.5	7	9.5	55	82.1	10	14.9	2	3.0
Delaware	19	82.6	4	17.4	17	94.4	1	5.6		
Florida	113	91.9	10	8.1	102	90.3	9	8.0	2	1.7
Georgia	76	76.8	23	23.2	74	97.4	2	2.6		
Idaho	30	96.8	1	3.2	25	83.3	5	16.7		
Illinois	311	92.0	27	8.0	274	88.7	27	8.7	8	2.6
Indiana	153	96.2	6	3.8	151	98.7	2	1.3		
Iowa	97	96.0	4	4.0	89	92.7	6	6.3	1	1.0
Kansas	58	92.1	5	7.9	56	96.6	2	3.4		
Kentucky	47	88.7	6	11.3	44	93.6	3	6.4		
Louisiana	58	89.7	6	10.3	46	88.5	4	7.7	2	3.8
Maine	21	91.3	2	8.7	20	95.2	1	4.8		
Maryland	60	81.1	14	18.9	56	98.2	1	1.8		
Massachusetts	142	92.2	12	7.8	129	92.2	10	7.1	1	0.7
Michigan	192	93.7	13	6.3	174	91.1	14	7.3	3	1.6
Minnesota	113	93.4	8	6.6	98	88.3	13	11.7		
Mississippi	38	80.9	9	19.1	34	89.5	3	7.9	1	2.6
Missouri	114	91.2	11	8.8	105	92.9	8	7.1		
Montana	27	90.0	3	10.0	23	92.0	2	8.0		
Nebraska	46	92.0	4	8.0	43	93.5	3	6.5		
Nevada	6	100.0	...	...	6	100.0	...	...		
New Hampshire	19	90.5	2	9.5	18	100.0	...	...		
New Jersey	230	96.6	8	3.4	216	94.3	11	4.8	2	0.9
New Mexico	22	95.7	1	4.3	19	86.4	3	13.6		
New York	478	92.8	37	7.2	458	96.0	17	3.6	2	0.4
North Carolina	86	86.9	13	13.1	73	84.9	13	15.1		
North Dakota	18	90.0	2	10.0	17	94.4	1	5.6		
Ohio	286	94.4	17	5.6	279	97.9	6	2.1		
Oklahoma	56	93.3	4	6.7	54	96.4	2	3.6		
Oregon	54	96.4	2	3.6	51	94.4	2	3.7	1	1.9
Pennsylvania	330	91.4	31	8.6	307	93.3	20	6.1	2	0.6
Rhode Island	20	90.9	2	9.1	18	90.0	2	10.0		
South Carolina	31	93.9	2	6.1	27	87.1	4	12.9		
South Dakota	9	90.0	1	10.0	6	66.7	3	33.3		
Tennessee	76	91.6	7	8.4	67	88.2	8	10.5	1	1.3
Texas	220	92.8	17	7.2	203	92.7	15	6.8	1	0.5
Utah	15	88.2	2	11.8	11	73.3	4	26.7		
Vermont	16	88.9	2	11.1	14	87.6	1	6.2	1	6.2
Virginia	57	89.1	7	10.9	52	91.2	4	7.0	1	1.8
Washington	101	94.4	6	5.6	91	91.9	8	8.1		
West Virginia	50	90.9	5	9.1	41	82.0	8	16.0	1	2.0
Wisconsin	110	97.3	3	2.7	96	87.3	11	10.0	3	2.7
Wyoming	13	86.7	2	13.3	11	84.6	2	15.4		
Dist. of Columbia	39	95.1	2	4.9	37	97.4	1	2.6		
United States	4,831	92.3	405	7.7	4,449	92.6	316	6.6	39	0.8
Hawaii	20	100.0	...	...	20	100.0	...	...		
Alaska	2	66.7	1	33.3	...	...	2	100.0		
Grand total	4,856	92.3	406	7.7	4,469	92.6	318	6.6	39	0.8

underwriter in order to obtain professional liability coverage (table 11). These figures do not appear to substantiate the charge that professional liability insurance is frequently sold on a "tie-on" basis with other casualty insurance.

TABLE 11.—*"Did you have to purchase other insurance from your company or agent in order to obtain professional liability insurance? No. . . . Some. . . . All. . . . In your opinion the cost of this professional liability insurance is: reasonable. . . . excessive. . . ."*

	Required to Purchase Other Insurance			Cost of Insurance			
				Reasonable		Excessive	
	No	Some	All	No.	%	No.	%
Alabama	25	...		15	60.0	10	40.0
Arizona	22	7	2	14	45.2	17	54.8
Arkansas	32	1		14	43.8	18	56.2
California	510	28	4	161	29.8	379	70.2
Colorado	59	4		17	27.9	44	72.1
Connecticut	56	9		40	64.5	22	35.5
Delaware	18	...		14	77.8	4	22.2
Florida	102	10	1	58	52.7	52	47.3
Georgia	73	1		27	36.0	48	64.0
Idaho	26	3		17	56.7	13	43.3
Illinois	281	14	3	223	73.4	81	26.6
Indiana	146	...	1	115	77.7	33	22.3
Iowa	92	2		75	78.1	21	21.9
Kansas	53	3	1	45	78.9	12	21.1
Kentucky	46	...	1	31	67.4	15	32.6
Louisiana	44	2	1	26	53.1	23	46.9
Maine	19	2		11	55.0	9	45.0
Maryland	59	...		32	57.1	24	42.9
Massachusetts	127	13		96	68.1	45	31.9
Michigan	171	16		147	79.5	38	20.5
Minnesota	94	9	1	34	32.7	70	67.3
Mississippi	37	1		9	23.7	29	76.3
Missouri	107	4	1	57	51.8	53	48.2
Montana	26	1		5	19.2	21	80.8
Nebraska	39	6		26	56.5	20	43.5
Nevada	6	...		2	33.3	4	66.7
New Hampshire	19	...		16	94.1	1	5.9
New Jersey	220	4		103	47.2	115	52.8
New Mexico	19	3		9	40.9	13	59.1
New York	469	3	1	212	45.8	251	54.2
North Carolina	73	10		25	30.9	56	69.1
North Dakota	16	1		10	55.6	8	44.4
Ohio	276	3		215	76.8	65	23.2
Oklahoma	54	...	2	39	72.2	15	27.8
Oregon	50	1		36	66.7	18	33.3
Pennsylvania	309	12	1	265	82.0	58	18.0
Rhode Island	15	3		14	70.0	6	30.0
South Carolina	29	2		18	58.1	13	41.9
South Dakota	5	3		2	25.0	6	75.0
Tennessee	67	6	1	25	33.8	49	66.2
Texas	212	6	1	164	74.9	55	25.1
Utah	14	...		4	26.7	11	73.3
Vermont	14	2		15	15.0	...	...
Virginia	48	6		27	48.2	29	51.8
Washington	75	19	2	32	33.3	64	66.7
West Virginia	37	10	1	31	62.0	19	38.0
Wisconsin	95	10	2	61	56.5	47	43.5
Wyoming	11	1		4	30.8	9	69.2
Dist. of Columbia	37	...		8	21.6	29	78.4
United States	4,434	241	27	2,646	56.4	2,042	43.6
Hawaii	19	...		8	42.1	11	57.9
Alaska	2	...				2	100.0
Grand total	4,496 (94.3%)	241 (5.1%)	27 (0.6%)	2,654	56.4	2,055	43.6

In times of rising costs, it might be suspected, that the usual reply as to whether the cost of a particular commodity is "reasonable" or "excessive" would be the latter. Yet, 56.4% of all physicians responding to the question concerning the cost of their professional liability insurance felt that the cost was "reasonable." However, in 20 states the majority of respondents consider professional liability insurance rates as excessive (table 11).

Incidence of Malpractice Claims

The answers to this question indicate that approximately 86% of the physicians now in practice have never been faced with a malpractice claim (table 12). A higher ratio of physicians in California than in any other state have experienced claims—24.7%. This figure

TABLE 12.—*"Have any professional liability claims ever been brought against you? Yes. . . . No. . . ."*

	Yes		No	
	Number	Per Cent	Number	Per Cent
Alabama	3	9.1	30	90.9
Arizona	7	21.9	25	78.1
Arkansas	4	9.8	37	90.2
California	146	24.7	446	75.3
Colorado	11	14.3	66	85.7
Connecticut	3	4.1	71	9.6
Delaware	...	...	23	100.0
Florida	15	12.2	108	87.8
Georgia	14	14.0	86	86.0
Idaho	6	19.4	25	80.6
Illinois	47	13.8	293	86.2
Indiana	15	9.4	145	90.6
Iowa	12	11.7	91	88.3
Kansas	5	7.8	59	92.2
Kentucky	2	3.8	51	96.2
Louisiana	4	6.8	55	93.2
Maine	5	20.8	19	79.2
Maryland	4	5.3	71	94.7
Massachusetts	25	16.1	130	83.9
Michigan	28	13.5	179	86.5
Minnesota	23	19.0	98	81.0
Mississippi	3	6.4	44	93.6
Missouri	14	11.2	111	88.8
Montana	7	23.3	23	76.7
Nebraska	8	16.0	42	84.0
Nevada	1	16.7	5	83.3
New Hampshire	2	9.5	19	90.5
New Jersey	20	8.3	220	91.7
New Mexico	3	13.0	20	87.0
New York	107	20.7	411	79.3
North Carolina	11	11.0	89	89.0
North Dakota	3	15.0	17	85.0
Ohio	36	11.8	268	88.2
Oklahoma	7	11.7	53	88.3
Oregon	11	19.3	46	80.7
Pennsylvania	23	6.4	339	93.6
Rhode Island	5	22.7	17	77.3
South Carolina	...	...	33	100.0
South Dakota	2	20.0	8	80.0
Tennessee	12	14.3	72	85.7
Texas	24	10.1	214	89.9
Utah	1	5.9	16	94.1
Vermont	1	5.6	17	94.4
Virginia	7	10.8	58	89.2
Washington	24	22.4	83	77.6
West Virginia	9	16.4	46	83.6
Wisconsin	18	15.5	98	84.5
Wyoming	1	6.7	14	93.3
Dist. of Columbia	8	19.5	33	80.5
United States	747	14.2	4,524	85.8
Hawaii	1	5.0	19	95.0
Alaska	...	...	3	100.0
Grand total	748	14.1	4,546	85.9

seems to bear out the opinion of 59.7% of the California respondents shown on table 1 that professional liability claims have increased during the past five years.

Those physicians who had experienced professional liability claims were requested, by a follow-up questionnaire, to submit detailed case histories regarding these claims. An analysis of these claims, accompanied by appropriate statistical charts, will be published in this column in an early issue of THE JOURNAL.

MEDICAL NEWS

CALIFORNIA

Oakes Foundation Laboratory.—The Roscoe and Margaret Oakes Foundation has made a grant of $984,698 to build in Palo Alto the Roscoe and Margaret Oakes Laboratories of Radiology and Biophysics. The foundation is a charitable organization established by the will of the late Mrs. Roscoe F. Oakes for the purpose, among others, of supporting medical research.

The Oakes Laboratory will be located in the section of the new Medical Center connecting the Palo Alto–Stanford Hospitals and medical school buildings. The building will be on the campus side of the center, with its own entrance appropriately designated. It will have approximately 32,000 square feet of floor space. The first floor will be given over to facilities for diagnostic roentgenology and related research. The ground floor will be devoted to basic research in radiation biochemistry, radiobiology, biophysics, and experimental radiation therapy, and will house the linear accelerator, isotope laboratories, and radiographic motion picture facilities.

CONNECTICUT

Dr. Osborn Honored.—At the recent annual meeting of the Massachusetts Public Health Association the association's Lemuel Shattuck medal was awarded to Dr. Stanley H. Osborn, commissioner of the Connecticut State Department of Health. The Lemuel Shattuck award was established in 1950 by the Massachusetts Public Health Association to honor each year a resident of New England selected "for outstanding service in public health." Dr. Osborn, recipient of honorary degrees from Tufts College, doctor of science, and from Trinity College, doctor of public health, was appointed deputy commissioner of the Connecticut State Department of Public Health in 1920 and in two years became commissioner.

Test Form for Child Eye Defects.—A new test form to approach to the problems of finding child eye defects early has been adopted in Connecticut. Eye specialists who form the Committee on Eye Care of the Connecticut State Medical Society have worked with the Connecticut State Department of Health and Connecticut State Department of Education in developing the standards of eye testing on which the form is based. Dr. Clement Clarke, New Haven, chairman of the committee, points out that the new test form will be more effective in meeting the statutory requirement for testing the vision of all children in the public schools every year. The form records the results of the school screening test and the report of the eye examination. The reverse side gives the standards of vision for children in different age groups. The importance of cooperation by parents, teachers and school nurses is emphasized in connection with a check list of what to look for when considering the health of a child's eyes.

FLORIDA

Society News.—The following officers were elected at a recent meeting of the Florida Society of Anesthesiologists: president, Dr. Stanley H. Axelrod, Miami Beach; president-elect, Dr. Brenkinridge W. Wing, Orlando; vice-president, Dr. Richard S. Hodes, Tampa; and secretary-treasurer, Dr. George C. Austin, Miami.

Personal.—Dr. Ralph M. Waters received an honorary doctor of science degree at the 131st commencement of Western Reserve University, Cleveland. A graduate of Western Reserve University School of Medicine 50 years ago, he has performed research at the University of Wisconsin, Madison, and now is a professor emeritus from that university. He lives in Orlando.

GEORGIA

Society News.—At the annual meeting of the Georgia Society of Anesthesiologists the following officers were elected: president, Dr. Lester Rumble Jr.; secretary-treasurer, Dr. Richardson L. Stone, Savannah.

Surgery Department Chairman.—Dr. John D. Martin, clinical professor of surgery, Emory University School of Medicine, Atlanta, has been named chairman of the department of surgery. Dr. Martin will fill the position opened by the resignation of Dr. John M. Howard earlier this year, and his appointment will be effective Sept. 1. He has been a member of the Emory faculty since 1930. Dr. Martin is associate editor of *The American Surgeon*. His special interest is in the treatment of burns. He is also chief of surgical service in the Emory University Hospital. At present he is a consultant in surgery for the Veterans Administration and the U. S. Army and serves as division surgeon of four railway companies. Dr. Martin joined the Emory faculty as an assistant in surgery in 1930. From 1931 to 1942 he was in charge of the surgical pathology laboratory at Grady Memorial Hospital. In 1951 he became clinical professor, and chief of surgery in the Emory hospital.

MASSACHUSETTS

New Infectious Disease Department.—The New England Center Hospital, Boston, has announced the establishment of a new department of infectious diseases under the direction of Dr. Louis Weinstein, who, in addition to being named chief of the new unit and senior physician at the hospital, has also been appointed professor of medicine at Tufts College Medical School. Both the hospital and the medical school are part of Boston's New England Medical Center. To accept these appointments, Dr. Weinstein has resigned as chief of the infectious diseases service at Haynes Memorial of the Massachusetts Memorial Hospitals

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

and as associate professor of medicine at Boston University School of Medicine. The new service will include patient care, research, and teaching, and will begin on Sept. 1.

Scholarship for Medical Research.—A James S. Kemper Foundation scholarship for medical research has been awarded by the American College of Surgeons to Dr. Stanley W. Jacob, of Boston. Dr. Jacob, chief resident surgeon on the Harvard Surgical Service at Boston City hospital, will utilize his three-year grant for private research of histochemical and physiologic studies in renal transplantation. He completed an 18-month Harvard research fellowship in surgery at Beth Israel Hospital in Boston before assuming his present position last year. The scholarship grant under which Dr. Jacob will study was established recently by the Kemper Foundation, incorporated in Illinois 15 years ago for philanthropic and educational purposes. Originator and president of the foundation is James S. Kemper, former U. S. Ambassador to Brazil and chairman of companies in the Kemper insurance group.

MICHIGAN

Residencies in Pediatric Pathology.—Residency positions are available in pediatric pathology and in hematology at the Children's Hospital of Michigan, Detroit. The pathology department is included in the department of laboratories, under the direction of Dr. Wolf W. Zuelzer, and is associated with an active hematology clinic and research laboratories. Clinical conferences and ward rounds are held regularly, and during the school year the hospital is the Pediatric Teaching Service of Wayne State University School of Medicine. Positions are available for one year, starting any time. Training is recognized by the American Boards of Pediatrics, Pathology and Radiology, and the Canadian Board of Pediatrics. The annual stipend is $2,400, and room and board. Address inquiries to Dr. Jay Bernstein, Department of Pathology, Children's Hospital of Michigan, 5224 St. Antoine St., Detroit 2, Mich.

MINNESOTA

Society News.—The officers of the Minnesota Psychiatric Society, a District Branch of the American Psychiatric Association, are as follows: president, Dr. Howard P. Rome; president-elect, Dr. Dale Cameron; and secretary-treasurer, Dr. Edward M. Litin.

Dr. Huenekens Honored.—Dr. Edgar J. Huenekens is the recipient of the F. A. Harrington award for outstanding service in the field of public health. This honor was conferred at a dinner of the Upper Midwest Hospital Conference. A long-time member of the Minneapolis Board of Public Welfare and medical director of the Elizabeth Kenny Institute, Dr. Huenekens presided over the Hennepin County Medical Society in 1941-1942 and is presently serving as a member of the Minnesota State Board of Health. In 1953 he was given the Distinguished Community Services award by the Community Chest and Council, and his medical confreres have presented him with the St. Barnabas Bowl award for meritorious service as a physician and as a citizen.

Tapeworm in Some Cattle.—The Minnesota Department of Health reports that in an epidemiological search recently conducted through the cooperation of federal meat inspectors in South St. Paul, a meat packing company, and the Minnesota Department of Health, a public health veterinarian found and condemned 10 head of cattle infected with the cysticercus bovis organism, a tapeworm. The veterinarian found the source to be a farmhand who infected the cattle. Tapeworm eggs were found in a specimen submitted by the employee who did not use the modern sanitary facilities provided on the farm. The department of health reports that he is now being treated and the barn is being properly disinfected.

MISSOURI

Fall Clinical Conference.—The 34th annual Fall Clinical Conference of the Kansas City Southwest Clinical Society will be held Sept. 30-Oct. 3 at the Municipal Auditorium, Kansas City. Round table luncheons, clinical pathologic conference, and panel discussions will be presented. Dr. Paul Dudley White, president, International Society of Cardiology, will present the fifth Edward Holman Skinner Memorial Lecture, "Coronary Heart Disease in 1957." A symposium, "The Medical Effects of Radiation," will be moderated by Dr. Eugene P. Cronkite, head, division of experimental pathology, medical department, Brookhaven National Laboratories, and will include the following participants: Robert L. Corsbie, Ph.D., director, Civil Effects Test Group, United States Atomic Energy Commission; Simon Kinsmen, Ph.D., chief, Radiological Health Training Program, United States Public Health Service; and Dr. Justin J. Stein, director, Cancer Research Institute, University of California, Los Angeles. A colored television program will feature surgical operative procedures and clinical demonstrations, televised over a closed circuit from the Municipal General Hospital to the Little Theater, Municipal Auditorium. Scientific and technical exhibits and a program of entertainment are planned. For information write, Kansas City Southwest Clinical Society, 3036 Gillham Road, Kansas City 8, Mo.

NEW YORK

Division of Nuclear Medicine.—The Long Island Jewish Hospital, Glen Oaks, has established a division of nuclear medicine which will use radioactive isotopes for research, diagnosis, and treatment of illness, it has been announced. A unit of the new division is an isotope laboratory which cost $100,000. Dr. Joseph Greenbaum, former chief of the isotope laboratory at the United States Naval Hospital, St. Albans, will head the new division.

Establish Chair in Pediatrics.—Announcement of a new Frank L. Babbott Chair in Pediatrics at the State University of New York Downstate Medical Center in Brooklyn has been made. Now retired from medical practice, Dr. Babbott was a member of the board of trustees of the Long Island College of Medicine, the predecessor of the Downstate Medical Center, for 20 years. He was also first president of the Long Island College of Medicine. Prior to this, he was an

instructor in pediatrics at the Long Island College Hospital. The first man to hold the Frank L. Babbott Chair in Pediatrics will be Dr. Richard L. Day, who has been chairman of the department of pediatrics at the Downstate Medical Center since 1953. Dr. Babbott holds L.L.D. degrees from Amherst College and Brooklyn Polytechnic Institute, and has done graduate work in pediatrics at Johns Hopkins University, Baltimore, and Yale University, New Haven, Conn.

Testing Center for Highway Accidents Research.—The appointment of Dr. William Haddon Jr. as director of the Driver Research and Testing Center has been announced. The center is a joint undertaking of the State Health Department and the Bureau of Motor Vehicles in which the bureau is providing the funds and the Health Department is providing the professional direction. The center was established to conduct research into human factors involved in highway accidents. In addition, it serves in an advisory capacity concerning licensing of individuals suffering from various medical conditions which might influence their ability to operate an automobile. Dr. Haddon was formerly a member of the research staff of the Harvard School of Public Health, Boston. He served in the U. S. Air Force during World War II. He succeeds Dr. Donald L. Toker, a surgeon with the U. S. Public Health Service, who has been acting director of the center since August, 1956.

New York City

Personal.—Dr. Maximilian Silbermann, assistant clinical professor of neurology, College of Physicians and Surgeons, Columbia University, was elected as delegate to represent the American Neurological Association at the Fourth International Poliomyelitis Conference, in Geneva, Switzerland, from July 8-12.—Dr. William T. Strauss, formerly of Ciba Pharmaceutical Products, Inc., has joined Doherty, Clifford, Steers & Shenfield, Inc., as vice-president and director of the professional division. He was previously medical director of Chilcott Laboratories and before that he was assistant medical director of Hoffmann La Roche.

NORTH CAROLINA

Duke Medical Center.—The combined facilities for medical and nursing teaching treatment and research at Duke University School of Medicine, Durham, henceforth will be known as the Duke University Medical Center, it has been announced. The new name has been selected to provide an over-all designation for the many units that make up the medical portion of the Duke campus. These units include the School of Medicine, School of Nursing, Duke Hospital with its outpatient department and private diagnostic clinics, and buildings such as the Elizabeth P. Hanes Nurses' Residence and the William Brown Bell Medical Research Building. Each unit will retain its present name but will be considered part of the Medical Center in designation as well as fact. Thus, the hospital mailing address, for example, will be: Duke Hospital, Duke University Medical Center, Durham, N. C.

OHIO

Hospital News.—The St. Elizabeth Hospital of Youngstown, Ohio, Alumni Association has announced its annual Ex-Intern and Resident Day, the program for which will commence Sept. 5 at the hospital. The featured speaker for the occasion will be Dr. Hugh Stephenson Jr., chairman, department of surgery, University of Missouri, Columbia. All former interns and residents of St. Elizabeth Hospital and all Ohio medical students are invited.

GENERAL

Prevalence of Poliomyelitis.—According to the Office of Vital Statistics, the following number of reported cases of poliomyelitis occurred in the United States, its territories and possessions in the weeks ended as indicated:

Area	July 7, 1957		July 6, 1956
	Paralytic Type	Total	Total
New England States			
Maine			
New Hampshire			
Vermont			2
Massachusetts		1	1
Rhode Island			
Connecticut			2
Middle Atlantic States			
New York		4	5
New Jersey			3
Pennsylvania			3
East North Central States			
Ohio		2	11
Indiana		2	10
Illinois		3	35
Michigan		6	4
Wisconsin	1	4	2
West North Central States			
Minnesota			1
Iowa		2	5
Missouri	1	3	6
North Dakota			2
South Dakota			
Nebraska		2	1
Kansas		1	2
South Atlantic States			
Delaware		1	1
Maryland			1
District of Columbia			
Virginia	1	2	1
West Virginia			1
North Carolina	1	6	6
South Carolina	4	5	3
Georgia	3	3	2
Florida			6
East South Central States			
Kentucky			9
Tennessee	3	19	1
Alabama		1	
Mississippi		2	12
West South Central States			
Arkansas	2	3	5
Louisiana	2	12	18
Oklahoma	2	5	10
Texas	24	45	49
Mountain States			
Montana			
Idaho		1	2
Wyoming			1
Colorado		1	4
New Mexico		1	5
Arizona			4
Utah		2	1
Nevada	1	1	1
Pacific States			
Washington			
Oregon		1	2
California	5	13	33
Territories and Possessions			
Alaska			
Hawaii			
Puerto Rico	1	1	1
Total	51	155	274

Influenza Scattered Widely.—The U. S. Health Department Morbidity and Mortality Weekly Report, dated July 19, says that the influenza outbreak that occurred recently in a youth conference group in Grinnell, Iowa, "did not terminate when the delegates left to return to their respective homes. As previously reported 15 of those in attendance became ill on the train and were hospitalized in Chicago. Dr. R. E. Teague, Kentucky Commissioner of Health, reports that about 30 returned to Lexington and Louisville on July 2 and that 8 had symptoms on arrival. About 20 others became ill in the following week. Dr. John Mason, New Mexico Department of Public Health, states that three who returned to New Mexico developed the disease shortly after arrival. One secondary case in the family of one of the cases has been found. Dr. S. H. Osborn, Connecticut Commissioner of Health, has reported two suspect cases who returned from Grinnell by automobile with seven other young people and two adults. One became ill en route home on July 3 and the second case developed symptoms about a week later. It was also stated that a young man from Rhode Island who traveled with the party had a mild type of illness on July 4. Dr. Charlotte Silverman, Maryland State Department of Health, reports that a 16-year-old girl became ill on the train when returning to her home in Montgomery County. Dr. A. L. Marshall, Indiana State Board of Health, says that several persons in the State were ill after returning from Grinnell. Dr. A. P. McKee, University of Iowa, has isolated strains of virus from several throat washings taken in Grinnell, which are antigenically similar to Far East strains. Dr. S. S. Chapman, Kentucky State Department of Health, has reported similar findings on throat washings taken from persons who returned to that state. Laboratory studies on the group in Chicago are still in progress according to Dr. H. J. Shaughnessy. Reports are not yet available for the cases in New Mexico, Maryland, Indiana and Connecticut.

Dr. A. A. Jenkins, Utah Department of Health, reports that 12 contacts of the group in Salt Lake City reported last week as having influenza have developed a similar type of illness. A report of the laboratory findings in this outbreak indicates that a virus resembling the Far East strain was the etiologic agent.

Information has been received that an influenza-like disease developed on a military installation in Texas following transfer of personnel from San Diego. In the San Diego outbreak, 32 strains of influenza A virus were isolated by Dr. C. G. Loosli, University of Chicago, from 50 throat washings. He reports that 20 thus far have been shown to be closely related to the A/Japan/305/57 strain. Hemagglutination inhibition with the 20 strains did not occur when A/Denver/1-57 and B/Great Lakes/1739/54 antisera were employed.

Dr. James Culver, California State Department of Public Health, reports the isolation of a virus serologically related to the Far East strain and has found that 12 of 26 paired blood specimens from influenza cases at Fort Ord have shown diagnostic titer rises in complement-fixation tests carried out with A/Japan/307-57 antigen.

Dr. H. M. Hardwicke, Missouri Department of Public Health and Welfare, has reported the occurrence of an unusual number of illnesses in Columbia, which are characterized by sudden onset, fever, muscle pains, dry cough, nausea, and loss of appetite. Since there was considerable diversity of symptoms in different patients it was suspected that more than one type of infection might be present in the community. It is estimated that there have been 200 to 300 cases, mostly in children, and that the peak of the epidemic has been reached.

Dr. W. S. Jordan, Western Reserve University, Cleveland, has reported the isolation of a second strain of the Far East influenza virus in Cleveland."

Fellowship Grants in Psychiatry.—The American Psychiatric Association has announced the award of 19 Smith, Kline and French Foundation Fellowships in Psychiatry. Thirteen of these will enable medical students to participate in psychiatric research or training programs this summer. Two other student programs will start in the fall.

In all, 34 undergraduates throughout the nation will benefit. Their projects range from a study of the chemical functionings of the brain to an analysis of Seattle's high suicide rate. The foundation has given the American Psychiatric Association a total of $90,000 for the three years, 1955 through 1957. The recent awards total $16,733.05. These fellowships are administered by a committee named by the association. Applications for consideration in October must be received by the Fellowship Committee by Sept. 16. Information may be obtained from the Fellowship Committee, Box 7929, Philadelphia, Pa. The grants included the following:

Dr. Ian Gregory, the Ontario Hospital, London, Ont., Canada, a grant toward the expenses of a year of study to obtain a Master of Public Health Degree.

Dr. Alexander P. Dukay, chief of male service, Ypsilanti State Hospital, Ypsilanti, Mich., to enable Dr. Dukay to spend one month at the Boston Psychopathic Hospital this summer to study the organization of research activities there.

Vermont State Hospital, Waterbury, Vt., a grant to organize a regular monthly lectureship.

Eastern State Hospital, Medical Lake, Wash., a grant to help defray the costs of a guest-lectureship series in connection with the hospital's summer training program.

National Medical Association Meeting.—The 62nd convention of the National Medical Association will be held in Cleveland Aug. 12-15, with headquarters at the Hotel Hollenden. The presidential address will be given by Dr. Theodore R. M. Howard, Chicago. Guest speakers at the general sessions include: Dr. Charles Puestow, professor of surgery, University of Illinois College of Medicine, Chicago, "Management of Pancreatitis," and Dr. Charles W. Mayo, Rochester, Minnesota, "The Question of Preservation of the Sphincters in Carcinoma of the Rectum and Rectosigmoid Area." At the general sessions the following panel discussions will be held: "What's New in Pediatrics, Medicine, Gynecology, and General Surgery," moderated by Dr. Matthew Walker, Nashville, Tenn.; "The Peptic Ulcer Problem," moderated by Dr. Martin R. Sutler, Cleveland. The Frederick W. Stubbs Me-

morial Lecture, "Nodules in the Breast" will be presented by Dr. Samuel O. Freedlander, director, department of surgery, Mount Sinai Hospital, Cleveland, Ohio. A special round-table discussion is planned for Aug. 14 with Dr. William H. Sinkler presiding. Entertainment includes the presidential ball to be held Aug. 15. A special ladies' program is planned. For information write Dr. John T. Givens, Executive Secretary, National Medical Association, Inc., 1108 Church St., Norfolk 10, Va.

FOREIGN

Congress for Cell Biology.—The ninth International Congress for Cell Biology, presented under the auspices of the International Society for Cell Biology, will be held Aug. 28-Sept. 3, in St. Andrews, Scotland. The official headquarters for the congress will be Younger Hill. About 200 papers are scheduled for presentation in English, French, and German. The presidential address, "50 Years of Tissue Culture," will be presented by P. J. Gaillard. Special film sessions will supplement the plenary and section meetings. Trade demonstrations of scientific instruments and apparatus are planned for Aug. 31 and scientific exhibits will be on view. A ladies' program has been arranged. Entertainment will include motor tours to East Fife and through highlands to Blair Castle. For information write Professor J. F. Danielli, Secretary-Treasurer, King's College, London, W. C. 2.

Symposium on Hair Growth.—The British Society for Research of Ageing will present a symposium on the Biology of Hair Growth at the Royal College of Surgeons, London, England, Aug. 7-9. The program, under the chairmanship of Professor William Montagna, includes presentations by speakers from the United States, Germany, and England, including the following:

Histochemistry of the Hair Follicle, O. Braun-Falco, Mainz, Germany.
Electron Microscopy of the Hair Follicle, E. H. Mercer, London.
Electron Microscopy of the Melanocyte and the Spread of Pigment, M. S. C. Birbeck, London.
Vascularity and Patterns of Growth of Hair Follicles, A. Durward, Leeds, England.
Mitotic Activity, William S. Bullough and Edna B. Laurence, London.

A special topic of discussion, Aug. 9, is "Factors Which Influence the Growth of Hair." Open discussions will follow the formal presentations. A program of entertainment is planned including a subscription dinner, Aug. 8. For information write Professor Willima Montagna, Department of Biology, Brown University, Providence, R. I.

CORRECTIONS

Liver Damage.—In the item "New Medical Journal" appearing in Foreign Letters (April 20, page 1554), the liver damage was induced by carbon tetrachloride and not by chloroform as stated.

Doctors as Diplomats.—An item appeared in the Organization Section of THE JOURNAL, July 13, page 1258, entitled "Doctors as Diplomats," stating that the Smith, Kline & French Laboratories, with the cooperation of the American Medical Association, would televise a "March of Medicine" program, built around the activities of American physicians throughout the world, over the NBC network on Dec. 3 during the A. M. A. Clinical Session in Philadelphia. These plans have been changed and there will be no further "March of Medicine" programs during 1957, but there will be two one-hour films televised during the first six months of 1958.

EXAMINATIONS AND LICENSURE

BOARDS OF MEDICAL EXAMINERS

CALIFORNIA: *Written Examination.* Los Angeles, Aug. 19-22; Sacramento, Oct. 21-24. *Oral Examination.* Los Angeles, August 17; San Francisco, Nov. 16. *Oral and Clinical for Foreign Graduates.* Los Angeles, Aug. 18; San Francisco, Nov. 17. Sec., Dr. Louis E. Jones, 1020 N St., Sacramento 14.

DISTRICT OF COLUMBIA:* *Reciprocity.* Washington, Sept. 9. *Examination.* Washington, Nov. 12-13. Deputy Director, Mr. Paul Foley, 1740 Massachusetts Ave., N.W., Washington, D. C.

GEORGIA: *Examination.* Atlanta, Oct. 8-9. *Reciprocity.* Atlanta, Oct. 10. Sec., Mr. Cecil L. Clifton, 111 State Capitol, Atlanta 3.

MINNESOTA:* *Examination and Reciprocity.* Minneapolis, Oct. 15-17. Sec., Dr. F. H. Magney, 230 Lowry Medical Arts Bldg., St. Paul 2.

MONTANA: *Examination and Reciprocity.* Helena, Oct. 1-2. Sec., Dr. Thomas L. Hawkins, 555 Fuller Ave., Helena.

NEW HAMPSHIRE: *Examination and Reciprocity.* Concord, Sept. 11-13. Sec., Dr. John S. Wheeler, 107 State House, Concord.

VIRGINIA: *Reciprocity.* Richmond, Dec. 4. *Examination.* Richmond, Dec. 5-7. Address: Office of the Secretary, 631 First St., S.W., Roanoke.

ALASKA:* On application in Anchorage and Juneau. Sec., Dr. W. M. Whitehead, 172 South Franklin St., Juneau.

GUAM: *Subject to Call.* Act. Sec., Dr. S. F. Provencher, Agana.

PUERTO RICO: *Examination.* San Juan, September 4. Sec. Mr. Joaquin Mercado Cruz, Box 9156, Santurce.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARKANSAS: *Examination.* Little Rock, Oct. 7-8. Sec., Mr. S. C. Dellinger, Zoology Department, University of Arkansas, Fayetteville.

COLORADO: *Examination and Reciprocity.* Denver, Sept. 4-5. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver 18.

DISTRICT OF COLUMBIA: *Examination.* Washington, Oct. 21-22. Deputy Director, Mr. Paul Foley, 1740 Massachusetts Ave., N. W., Washington, D. C.

MICHIGAN: *Reciprocity.* Ann Arbor, Sept. 7. *Examination.* Ann Arbor and Detroit, Oct. 11-12. Sec., Mrs. Anne Baker, 116 Stevens T. Mason Bldg., West Michigan Ave., Lansing.

OKLAHOMA: *Examination.* Oklahoma City, Sept. 27-28. Sec., Dr. E. F. Lester, 813 Braniff Bldg., Oklahoma City.

RHODE ISLAND: *Examination.* Providence, Aug. 28. Administrator of Professional Regulation, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

WISCONSIN: *Examination.* Madison, Sept. 20 and Milwaukee, Dec. 7. Sec., Mr. William H. Barber, 621 Ransom St., Ripon

*Basic Science Certificate required.

GOVERNMENT SERVICES

AIR FORCE

Three Officers Receive Awards.—Col. John Paul Stapp, U.S.A.F., M.C., Aero Medical Field Laboratory, Holloman Air Force Base, N. Mex., was presented with the Eric Liljencrantz award at the recent Aero Medical Association meeting in Denver. The award, consisting of a plaque and honorarium, was given to Colonel Stapp for his achievements in the solution of problems of high-speed flight and acceleration.

The late Dr. Liljencrantz, whose memory the award perpetuates, was a reserve naval Medical Corps officer who lost his life in an aircraft accident in 1942 while conducting experiments with a new type of accelerometer. The award was established by the Chas. Pfizer & Company, Inc.

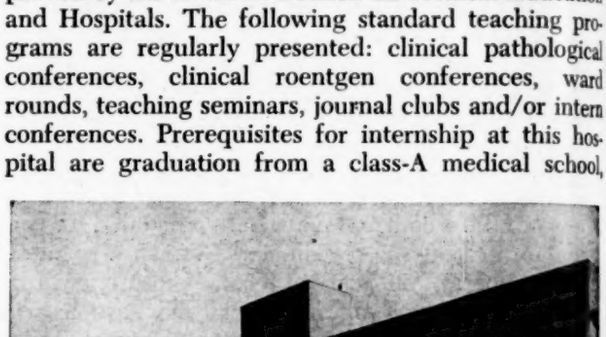
Major David G. Simons, U.S.A.F., M.C., chief, Space Biology Branch, Aero Medical Field Laboratory, Holloman Air Force Base, N. Mex., received the Arnold D. Tuttle award at the recent Aero Medical Meeting in Denver for the best research report published in the *Journal of Aviation Medicine* in the past two years. The winning article was "1954 Aero Medical Field Laboratory Balloon Flights; Physiological and Radiological Aspects." This award, which was established in 1952 by United Air Lines in memory of its late medical director, consists of an appropriate plaque and an honorarium.

Brig. Gen. Eugen G. Reinartz, U.S.A.F., M.C., retired, Carmel Valley, Calif., a past-president of the American Medical Association, received the Raymond F. Longacre award. This trophy is given annually for outstanding accomplishments in the psychological and psychiatric aspects of aviation medicine. General Reinartz was commandant of the U. S. Air Force School of Aviation Medicine during World War II.

Lackland—The First Air Force Teaching Hospital.—The new 3700th U. S. A. F. Hospital at Lackland Air Force Base, San Antonio, Texas, was scheduled for completion in July, 1957. It is a 500-bed structure with support facilities for 1,000 beds. It contains private and semiprivate rooms, wards, and clinical facilities, including x-ray and pathology department, anesthesia laboratory, cardiopulmonary function and diagnostic unit, renal unit, radioisotope laboratory, animal laboratory, surgical tissue bank, physiological training unit, audiometric training unit, and center for the diagnosis, testing, and equipping of the partially sighted. Patients will be able to communicate with nurses on a two-way communication system. Bed speakers are installed to provide piped-in radio programs, and a pneumatic tube system is provided throughout the entire hospital. The hospital structure is nine stories high.

Lackland, the first Air Force teaching hospital, has more than 35 physicians of local and national importance on the consultant staff, all of whom are diplomates of their respective specialty boards. These physicians are utilized fully in the teaching program. The hospital is affiliated with the University of Texas —Medical Branch, and conducts joint programs with the university as well as with various local hospitals in the San Antonio area.

Twenty-four rotating medical internships are offered beginning July 1 of each year. The program is approved by the A. M. A. Council on Medical Education and Hospitals. The following standard teaching programs are regularly presented: clinical pathological conferences, clinical roentgen conferences, ward rounds, teaching seminars, journal clubs and/or intern conferences. Prerequisites for internship at this hospital are graduation from a class-A medical school,



New Air Force Hospital

United States citizenship, and the acceptance of a commission as first lieutenant in the United States Air Force.

Lackland Air Force Base Hospital offers residencies in general surgery, orthopedic surgery, radiology, internal medicine, general practice, and anesthesiology.

ATOMIC ENERGY COMMISSION

Life Science Research Contracts.—The award of 31 unclassified life science research contracts in medicine, biology, biophysics, and radiation instrumentation was announced June 21 by the U. S. Atomic Energy Commission. The contracts were awarded to universities and private institutions as part of the commission's policy of fostering research and development in fields related to atomic energy as specified in the Atomic Energy Act of 1954, and as amended in 1956. Four of the awards are new projects: one in medicine, two in biology, and one in biophysics. Eleven awards for continuation of research are in medical sciences, 15 in biology, and one in radiation instrumentation.

The new contract in medicine was awarded to Dr. Barnes Woodhall, Duke University, Durham, N. C., for study of the biology of brain tumors. The largest individual award was made to Dr. Jean K. Weston, Parke, Davis & Company, Detroit, $80,000 for the study of factors elaborated by animal tissues which stimulate rate of regeneration of hematopoietic organs of animals exposed to total body irradiation with gamma rays.

DEATHS

deForest, Walter Robbins * Hamilton, Ohio; born in Syracuse, N. Y., Dec. 10, 1909; Columbia University College of Physicians and Surgeons, New York City, 1937; specialist certified by the American Board of Preventive Medicine; entered the medical corps of the U. S. Army in 1940; served at Gorgas Hospital in the Canal Zone and in the European theater from 1943 to 1945; again, from 1947 to 1949, saw service with the Public Health Section of the military government in Germany; later named chief of the medical affairs and public welfare board, Office of the U. S. High Command, Germany, in which capacity he served until February, 1951; attended the Potsdam Conference as staff surgeon; his final assignment, prior to his retirement from active duty in 1955, as lieutenant colonel, was as chief of preventive medicine at Fort Knox, Ky.; on retirement, accepted a position with the United Mine Workers of America's Welfare and Retirement Fund and served as deputy area medical administrator at Morgantown, W. Va.; in February, 1957, accepted the position of health officer for the city of Hamilton; member of the West Virginia State Medical Association; died in the Mercy Hospital May 18, aged 47, of cerebral hemorrhage and hypertension.

Trimble, Harold Guyon * Oakland, Calif.; born in Oakland Feb. 24, 1896; University of California School of Medicine, San Francisco, 1920; associate clinical professor of medicine at Stanford University School of Medicine in San Francisco; awarded the fourth Varrier–Jones memorial medal on the occasion of his lecture in London; past-president of the California Tuberculosis and Health Association and the American Trudeau Society; specialist certified by the American Board of Internal Medicine; member of the American College of Chest Physicians; fellow of the American College of Physicians; consultant, diseases of the chest, Contra Costa County Health Department; consultant, Alum Rock Sanatorium in San Jose, where he was a trustee; on the staffs of Providence, Alameda, and Peralta hospitals; was shot and killed May 13, aged 61.

Fromm-Reichmann, Frieda, Rockville, Md.; born in Karlsruhe, Germany, Oct. 23, 1889; Albertus-Universität Medizinische Fakultät, Königsberg, Prussia, Germany, 1913; an associate member of the American Medical Association; member of the Medical Society of the District of Columbia, American Psychoanalytic Association, and American Psychopathological Association; fellow of the American Psychiatric Association; past-president of the Washington Psychoanalytic Association; past-chairman of the faculty of the Washington School of Psychiatry; in 1952 received the Adolf Meyer Memorial award for outstanding contributions in the field of psychiatry; joint editor of "Progress in Psychotherapy"; for many years associated with the Chestnut Lodge Sanitarium, where she died April 28, aged 67, of acute coronary thrombosis.

* Indicates Member of the American Medical Association.

Stinson, John Wesley * Pittsburgh; Jefferson Medical College of Philadelphia, 1921; veteran of World War I; past-president of the Pittsburgh Surgical Society; fellow of the American College of Surgeons and formerly a governor; for many years associated with Pittsburgh Hospital; on the staff of St. Margaret's Hospital; formerly a fellow in surgery and assistant surgeon at the Mayo Clinic in Rochester, Minn.; received an honorary M.A. degree from Colby College, Waterville, Maine, in 1939; died May 28, aged 61, of coronary occlusion.

Dugan, John Brooks, San Francisco; Northwestern University Medical School, Chicago, 1947; member of the American Psychiatric Association; specialist certified by the American Board of Psychiatry and Neurology; formerly medical director of the Pinel Foundation Hospital and on the faculty of the University of Washington School of Medicine, both in Seattle; a lieutenant (jg) in the medical corps of the U. S. Naval Reserve from 1947 to 1949; died May 19, aged 32.

Eaton, Joseph Withington * St. Petersburg, Fla.; McGill University Faculty of Medicine, Montreal, Canada, 1935; member of the American Society of Anesthesiologists; served a residency at the Baroness Erlanger Hospital in Chattanooga, Tenn., and the Charity Hospital of Louisiana in New Orleans; at one time practiced in Manchester, N. H., where he was affiliated with Elliot and Sacred Heart hospitals; associated with Mound Park and St. Anthony's hospitals; accidentally drowned April 23, aged 49.

Adams, Mary F., Blooming Prairie, Minn.; Chicago College of Medicine and Surgery, 1916; died May 12, aged 66, of cerebral hemorrhage.

Brown, William Wallace, Wilmont, Minn.; University of the South Medical Department, Sewanee, Tenn., 1900; Wisconsin College of Physicians and Surgeons, Milwaukee, 1905; died in the Worthington (Minn.) Municipal Hospital April 4, aged 87.

Brucker, Karl Barnard * Lansing, Mich.; University of Michigan Homeopathic Medical School, Ann Arbor, 1909; member of the American Proctologic Society; died in St. Lawrence Hospital May 20, aged 72, of dissecting aneurysm of the aorta.

Bruun, Paul Edward, Springfield, Mass.; Temple University School of Medicine, Philadelphia, 1918; died in the Springfield Hospital May 20, aged 64, of heart disease.

Butler, William Berkley, Baltimore; University of Michigan Medical School, Ann Arbor, 1923; member of the Medical and Chirurgical Faculty of Maryland; died in the National Institute of Health, Bethesda, Md., Feb. 21, aged 59, of brain tumor.

Byers, Horace Wellington, Baltimore; University of Maryland School of Medicine, Baltimore, 1914; died May 8, aged 68.

Campbell, Charles R., Cincinnati; Eclectic Medical Institute, Cincinnati, 1906; for many years commissioner of Hamilton County; served as county health officer and as member and chairman of the first county school board and county board of health; died May 18, aged 81, of heart disease.

Canouse, Richard Eugene ✦ West Covina, Calif.; Temple University School of Medicine, Philadelphia, 1954; interned at Veterans Administration Hospital, Long Beach; died May 7, aged 33.

Caveness, Zebulan Marvin ✦ Raleigh, N. C.; University of North Carolina School of Medicine, Chapel Hill, 1903; served on the staff of the Rex Hospital; died May 14, aged 80, of heart disease.

Cheatham, James Clifton ✦ Wolfe City, Texas; Barnes Medical College, St. Louis, 1908; veteran of the Spanish–American War and World War I; past-president of the Hunt County Medical Society; died in the Becton Clinic and Hospital, Greenville, May 16, aged 80, of duodenal ulcer with acute obstruction.

Cleage, Albert B., Detroit; Indiana University School of Medicine, Indianapolis, 1910; for many years city physician; died April 15, aged 73.

Cogan, Sarah Edith Ives ✦ Belmont, Mass.; Woman's Medical College of Pennsylvania, Philadelphia, 1898; specialist certified by the American Board of Ophthalmology; died in Cambridge April 26, aged 83, of rupture of aneurism of the iliac artery.

Copley, Ernest Lee ✦ Richmond, Va.; Medical College of Virginia, Richmond, 1929; also an ordained minister; associated with Johnston–Willis and Stuart Circle hospitals, and the Retreat for the Sick and the Grace Hospital; died May 13, aged 67.

Craft, Edgar Dee, Major, U. S. Army, retired, Los Angeles; Medical Department of Tulane University of Louisiana, New Orleans, 1905; service member of the American Medical Association; entered the medical corps of the U. S. Army in 1911; retired May 15, 1917, for disability in line of duty; died Jan. 21, aged 76, of carcinoma of the stomach with metastases to liver.

Craig, Arthur D. ✦ Springfield, Mo.; St. Louis College of Physicians and Surgeons, 1896; died in the Springfield Baptist Hospital April 14, aged 87, of arteriosclerosis.

Cram, Albert Monroe ✦ Bridgewater, Vt.; George Washington University School of Medicine, Washington, D. C., 1912; past-president of the Vermont State Medical Society; in 1931 member of the House of Delegates of the American Medical Association; associated with the Rutland (Vt.) Hospital; died May 9, aged 74, of coronary thrombosis.

Culver, Charles M. ✦ Bell Gardens, Calif.; Jenner Medical College, Chicago, 1902; member of the Illinois State Medical Society; served on the staff of the Norwegian American Hospital in Chicago; died in Evanston, Ill., March 9, aged 82, of coronary insufficiency and cerebral thrombosis.

Cushing, Eleanore, Wauwatosa, Wis.; George Washington University School of Medicine, Washington, D. C., 1916; served as vice-president of the Medical Woman's National Association; past-president of the Wisconsin Medical Woman's Society; died May 1, aged 72.

Dalton, William Jack ✦ Cincinnati; University of Cincinnati College of Medicine, 1943; also a dentist, veteran of World War II; served on the faculty of the Ohio State University in Columbus; associated with Christ, Bethesda, and Good Samaritan hospitals; died May 3, aged 38, of coronary occlusion.

Davidian, Hagop, Philadelphia; George Washington University School of Medicine, Washington, D. C., 1911; served on the staffs of various Veterans Administration hospitals; at one time on the staff of St. Elizabeths Hospital in Washington, D. C.; died May 15, aged 79.

Dawson, Leon Ernest, Des Moines, Iowa; Creighton University School of Medicine, Omaha, 1914; an associate member of the American Medical Association; died in the Mercy Hospital May 21, aged 65, of carcinoma of the left lung.

Denham, Harry Courtenay ✦ Gloversville, N. Y.; Syracuse University College of Medicine, 1910; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; past-president of the Fulton County Medical Society; served on the staff of the Nathan Littauer Hospital; died in the Albany (N. Y.) Hospital May 2, aged 70.

Parker, John Z. ✦ Pattonsburg, Mo.; University Medical College of Kansas City, 1904; died in the Noll Memorial Hospital, Bethany, March 29, aged 78, of carcinoma of the prostate with metastases.

Pearson, Robert Garfield, Palm Springs, Calif.; University of Pennsylvania Department of Medicine, Philadelphia, 1908; an associate member of the American Medical Association; for many years practiced in Sacramento, where he was associated with the Mercy and Sutter hospitals; died April 27, aged 74.

Pirkner, Ernest Herman, Lake Placid, N. Y.; Ernst-Moritz-Arndt Universität Greifswald Medizinische Fakultät, Greifswald, Prussia, Germany, 1895; an associate member of the American Medical Association; died May 22, aged 86.

Quillen, Otis Lawrence ✦ St. Marys, W. Va.; College of Physicians and Surgeons, Baltimore, 1912; for many years county health officer; at one time superintendent of the West Virginia Training School; associated with St. Joseph and Camden Clark Memorial hospitals in Parkersburg; died April 30, aged 70, of cancer.

Rieser, Willy ✦ New York City; University and Bellevue Hospital Medical College, New York City, 1899; on the staffs of the Lebanon and Wickersham hospitals; died April 2, aged 83.

Roberts, Daniel Thomas, West Point, Ky.; University of Louisville (Ky.) School of Medicine, 1922; member of the Kentucky State Medical Association and the American Academy of General Practice; served on the staff of the Hardin Memorial Hospital in Elizabethtown; died April 8, aged 62.

Roberts, Melvin D. ✱ Hancock, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1903; veteran of World Wars I and II; died March 8, aged 77, of myocardial failure and arteriosclerosis.

Ryan, William Alward ✱ Milwaukee; Marquette University School of Medicine, Milwaukee, 1926; for many years on the faculty of his alma mater; veteran of World War II; associated with the Misericordia Hospital, where he was president of the staff and St. Joseph's Hospital; died March 22, aged 57, of heart failure.

Sawitz, William George, Philadelphia; Universität Rostock Medizinische Fakultät, Rostock, Mecklenberg, Germany, 1920; professor of parasitology at Jefferson Medical College; served as assistant in parasitology, instructor and assistant professor of parasitology at Tulane University of New Orleans; member of the American Society of Tropical Medicine; author of "Medical Parasitology"; died April 19, aged 63, of heart disease.

Schwartz, Frank Jacob ✱ Spring Valley, N. Y.; Baltimore Medical College, 1907; past-president of the Rockland County Medical Society; for many years member of the Spring Valley Village Board; associated with the Good Samaritan Hospital in Suffern; died April 22, aged 71, of arteriosclerotic heart disease.

Sellers, Charles Joseph ✱ Mount Moriah, Mo.; American Medical College, St. Louis, 1895; died in Bethany April 13, aged 85, of lobar pneumonia.

Sepple, Charles V., Oceanside, N. Y.; Chicago Medical School, 1925; died Jan. 31, aged 72, of circulatory failure and cachexia.

Settlage, Paul Henry, Madison, Wis.; University of Wisconsin Medical School, Madison, 1946; associate professor of anatomy at his alma mater; veteran of World War II; accidentally drowned in Lake Wingra April 20, aged 46, when his canoe capsized.

Shannon, Edwin Raymond ✱ Waterloo, Iowa; Chicago Homeopathic Medical College, 1896; fellow of the American College of Surgeons; on the staffs of St. Francis Hospital and Schoitz Hospital; one of the organizers, honorary member and past-president of the staff, Allen Memorial Hospital, where he died March 23, aged 84, of arteriosclerotic heart disease with myocardial failure.

Shelley, Joseph Lafayette, Howe, Texas; University of Tennessee Medical Department, Nashville, 1898; died in Sherman April 21, aged 83, of a heart attack.

Shepard, Marguerite Dunbar ✱ Hartford, Conn.; New York University College of Medicine, New York City, 1937; member of the American Trudeau Society; associated with Cedarcrest Sanatorium; died in the Hartford Hospital April 29, aged 48, of acute bronchial asthma.

Shepard, Ned D. ✱ Dayton, Ohio; Ohio State University College of Medicine, Columbus, 1936; member of the American Academy of General Practice; served as treasurer of the Montgomery County Medical Society; associated with Barney Convalescent Hospital, Good Samaritan Hospital, Miami Valley Hospital, and St. Elizabeth Hospital, where he died April 18, aged 46, of lymphosarcoma with metastasis.

Sietsema, Ebel, Chicago, Ill.; National Medical University, Chicago, 1907; died in Arlington Heights, March 5, aged 75, of cerebral hemorrhage and arteriosclerosis.

Utterback, Arnold ✱ West Terre Haute, Ind.; University of Louisville (Ky.) Medical Department, 1912; died Feb. 4, aged 71, of gastric hemorrhage and esophageal varices.

Vigle, John Barry, Burnside, Ky.; University of Louisville Medical Department, 1906; served on the staff of the Somerset (Ky.) City Hospital; died in Lexington March 24, aged 78, of heart disease.

Wantoch, Joseph ✱ Carteret, N. J.; Detroit College of Medicine, 1904; served as a member of the medical board of the Rahway (N. J.) Hospital, of which he was a founder; a founder and for many years associated with the Perth Amboy (N. J.) General Hospital, where he died April 19, aged 74, of coronary thrombosis.

Wolff, Herman Julius ✱ St. Paul; University of Minnesota Medical School, Minneapolis, 1930; clinical associate professor of internal medicine at his alma mater; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians; president-elect of the Minnesota Pathological Society; served on the staff of the Miller Hospital, where he died April 19, aged 50, of ventricular fibrillation, endocarditis, and pericarditis.

Wood, William Walter, Jamestown, N. D.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1906; fellow of the American College of Surgeons; for many years treasurer of the North Dakota State Medical Association; associated with the Trinity and Jamestown hospitals; died in Fort Worth, Texas, May 1, aged 77, of myelogenous leukemia.

Wylie, Charles B., Morgantown, W. Va.; Hering Medical College, Chicago, 1903; an associate member of the American Medical Association; specialist certified by the American Board of Otolaryngology; life member of the American Academy of Ophthalmology and Otolaryngology; honorary member of the staffs of Monongalia General and Vincent Pallotti hospitals; died in the White Cross Hospital, Columbus, Ohio, May 9, aged 93, of injuries received in a fall.

Yauger, George William ✱ Dayton, Ohio; University of Cincinnati College of Medicine, 1936; veteran of World War II; served on the staff of the Miami Valley Hospital; died in the Veterans Administration Center April 22, aged 51, of carcinoma of the scrotum.

Young, Robert Ulrich, Tampa, Fla.; Duke University School of Medicine, Durham, N. C., 1952; interned at the Grady Memorial Hospital in Atlanta, Ga.; served a residency at the Georgia Baptist and Tampa Municipal hospitals; associated with St. Joseph's Hospital; veteran of World War II; died April 11, aged 34, of myocardial infarction and arteriosclerotic coronary thrombosis.

FOREIGN LETTERS

AUSTRIA

Axial Bipolar Thoracic Leads.—At the meeting of the Vienna Society of Physicians, on May 31, A. J. Fiala said that electrocardiograms do not give the diagnostic information needed in many cases. The combined appliance of electrodes and the unipolar thoracic leads to the extremities also leaves much to be desired. The application of axial bipolar thoracic leads, however, extends the diagnostic usefulness of the electrocardiogram and permits better evaluation of the waves by virtue of relatively high amplitudes. The leads are axial in direction and use a pole on the right and on the left side of the thorax. Any kind of disturbance of the blood perfusion through the heart is registered. A rough differentiation of lesions of the right and the left side of the heart and of the septum can thus be made. If the thoracic leads are normal, the heart is almost certainly normal. This statement is not true of any of the leads previously used. Myocardial infarction and other severe injuries are sometimes detected only in the thoracic leads. These leads should be used routinely.

Basal Metabolism and Pentobarbital.—At the meeting of the Vienna Society for Internal Medicine, in March, R. Höfer and H. Vetter said that basal metabolic rates were determined in 22 hyperthyroid patients and in 58 euthyroid persons before and two hours after oral administration of 90 mg. of pentobarbital (Nembutal) sodium. An increased rate depending on the central nervous system decreases with the administration of pentobarbital, whereas an increase caused by the thyroid remains unchanged or decreases only slightly after the patient has taken the barbiturate. The same behavior is observed when an increase in basal metabolism is caused not by the thyroid but, for instance, by leukemia or emphysema. These preliminary results reveal that a more reliable diagnosis could be established by determining the basal metabolic rate after administration of pentobarbital.

Function of the Lymphocytes.—At the same meeting, H. Braunsteiner, J. Pärtan, and N. Thumb said that, for the examination of the leukocytes at the site of their function, small skin flaps of animals were excised and coverglasses were fastened over the wounds. After a first granulocytic-monocytic phase with phagocytosis lasting about 12 hours, immigration of typical small lymphocytes occurs. These lymphocytes quickly change into epithelioid cells from most of which giant cells originate by amitosis after 24 to 48 hours. Skin sensitivity to a suspension of Pasteurella tularensis can be transmitted in a specific way to Past. tularensis–negative persons by the leukocytes of patients who have had tularemia. These experiments indicated that the epithelioid and giant cells have the same ability as the lymphocytes to transmit Past. tularensis sensitivity to Past. tularensis–negative persons. A generalized sensitivity to Past. tularensis can be obtained by subcutaneous injection of a high dilution of only about 20 million of those cells. The function of the lymphocytes in combating infection seems, therefore, to consist of the immigration of antibodies into differentiated cells which become active at the site of the infection.

Tularemia.—At the meeting of the Vienna Society of Physicians, on June 14, J. Falisevac said that tularemia was unknown in Austria until 1953, although it had occurred in 1937 in Yugoslavia. Since then, tularemia has occurred in a small area of Croatia along the Save River and has affected 45 patients. Other regions of Croatia are free of tularemia in man and animal. Rabbits are the only reservoir of infection. In man, the disease occurs commonly as a family infection. The disease occurs chiefly in farmers who handle diseased rabbits or eat their meat. A veterinarian and his assistant were infected with pulmonary tularemia through the examination of animals. One woman died of generalized tularemia. Autopsy revealed submiliary disseminated nodules in the liver, spleen, and lymph nodes. Good therapeutic results were obtained in patients in whom treatment with antibiotics was started early.

Liver Cells in Hepatitis.—At the same meeting, K. Fellinger reported on 20 patients whose liver biopsy specimens were examined under the electron microscope. The sections taken from eight patients with homologous serum hepatitis regularly showed a dense interspersion of the plasma of the liver cells with spherical bodies about 450 angstrom units in diameter with a central osmiophilic nucleus, a light halo, and an outer limiting layer. The nuclei of the liver cells and of the stellate cells were free. The liver biopsy specimens were also free from evidences of obstructive jaundice. Different bodies were seen in livers of patients with infectious hepatitis.

BRAZIL

Splenic Trauma.—Dr. Osiris Cunha (*Rev. méd. munic.* 23:70, 1957) reported on 78 patients (1.17% with ruptures and wounds of the spleen among 6,690 surgical cases of all types. The cases were almost evenly distributed between the two age groups one 0 to 9 years of age and the other 60 to 69 years of age. These splenic lesions were caused by contusions in 49 patients and by penetrating wounds in 29. In 19 patients the penetrating wounds had been produced by firearms. The causes of the wounds were aggressions in 27 patients, vehicle accidents in 30, falls in 20, and attempted suicide in one. In 34 patients a single rupture or single wound was found; in 27, multiple ruptures; in 9, transfixing wounds; in 4, complete section of the spleen; in

The items in these letters are contributed by regular correspondents in the various foreign countries.

2. section of the hilum; and in 2 the lesion was not specified. The lesion was limited to the spleen in 28 patients and in 50 was associated with lesions of other organs (diaphragm, liver, small intestine, stomach, extremities, mesentery, colon, lungs, kidneys, bladder, and pancreas). The treatment of the splenic lesions involved splenectomy in 68 patients and splenorrhaphy in 10. There were 24 deaths among the 78 patients.

Manual Extraction of the Placenta.—Dr. B. Neme and co-workers (*An. brasil. ginec.* **22**:133, 1957) compared the results of manual extraction of the placenta before and after the advent of modern chemotherapy. In the periods 1920 to 1942 and 1943 to 1953, in which 36 and 75 obstetric cases, respectively, were terminated by manual extraction of the placenta, the average general fatality rate declined from 36.0% to 10.6% and the average fatality rate from infection declined from 19.4% to 6.6%. Delivery at home with all its known inconveniences was responsible for most of the deaths from hemorrhage and infection. Taking into consideration the place where the delivery was performed during the years 1920 to 1942, hospital care was responsible for the reduction of the case fatality rate from 50.0% to 16.6%. In the years 1943 to 1953, this rate was further reduced from 11.7% to 5.4%. Deaths from infection occurred in 33.3% of the manual extractions performed at home in the period 1920 to 1942 and in 5.2% in the period 1943 to 1953. No deaths from infection occurred at the hospital. In the presence of infection, manual extraction of the placenta is exceedingly dangerous. In the years 1920 to 1942, such cases were associated with a case fatality rate of 81.8%, and infection alone was responsible for a case fatality rate of 72.8%. In the years 1943 to 1953 the case fatality rate from infection was about 20%. For deliveries in the hospital the case fatality rate was 16.6% in the period 1920 to 1942 and 5.4% in the period 1943 to 1953. These figures show the small percentage of deaths at the hospital in comparison to the general case fatality rate. Manual extraction is advisable in all patients in whom the third stage of labor is delayed more than one hour. In the presence of copious bleeding, immediate surgical intervention is imperative. The use of oxytocics and the Credé method is advisable before trying manual extraction. The packing of the uterus should be considered exceptional, and it requires great skill.

Experimental Interatrial Septal Defects.—Dr. Ruy Margutti and co-workers (*Rev. paulista med.* **50**:161, 1957) reported on their experimental work leading to the production of interatrial defects. Because the methods described in the literature for the experimental production of such defects are so complex and give such unreliable results, the authors tried a new technique based on intracardiac tactile surgery, which proved to be simple and effective. They used 53 mongrel dogs, most of them anesthetized with 33 mg. of pentobarbital, given intraperitoneally, per kilogram of body weight. Respiration was maintained by means of a spiromatic respirator. Most of the dogs were subjected to transsternal thoracotomy, but some of them underwent thoracotomy through the fourth intercostal space. The pericardial sac was opened by a median longitudinal incision and sometimes by an incision near the phrenic nerve. A purse-string suture was made in both auricles. The left index finger was introduced into the right atrium and a universal valvulotome or a Bailey's surgical probe was guided along the finger. A section was made through the interatrial septum. The instrument was then taken off and, with the left finger still in the right atrium, a Brock punch was introduced into the left atrium. By means of the finger in the heart, the punch was introduced through the septal perforation and a piece of the septum removed. Afterwards, the Brock punch was taken off, and the purse-string suture of the left auricle was tied. The finger in the heart could then explore the defect and easily pass to the left atrium, palpating the mitral valve. The finger was then removed, and the purse-string suture of the right auricle tied. The pericardium was partially sutured.

Of the 53 operations in this series, the authors succeeded in making 52 defects with only 9 operative deaths (17.3%). In only 6 cases (11.5%) could they incriminate the technique for the deaths (5 hemorrhages and 1 ventricular fibrillation). Two deaths (3.8%) were due to hypertensive pneumothorax, and one (1.9%) to ventricular fibrillation occurring some time after the production of the septal defect. Of 43 dogs with a follow-up period of one week to more than six months, 42 were examined post mortem, and in all but one the authors found a persistent septal defect 10 to 25 mm. wide. In one case, a large thrombotic tampon had formed. In all the histopathological studies they found endothelization of the margin up to the end of the first week and hyperplasia of fibrotic tissue. The authors believe this technique for experimental production of interatrial septal defects to be simple and efficient.

NETHERLANDS

Protection Against Ionizing Radiations.—In view of the increasing use of x-rays and other ionizing radiations, the government in April enacted a bill to protect, insofar as possible, all personnel who may be exposed to these types of radiation in their work. For example, the personnel of hospital x-ray departments will be required to submit regularly to medical examinations and to wear film badges, so that the amount of radiation to which they have been exposed may be measured. The amount of radiation allowable for such personnel may not exceed 0.3 r in any week.

Poliomyelitis Vaccination.—Vaccination against poliomyelitis will start this fall and will include about 220,000 children born in 1955. The vaccine to be used will be imported from the United States, but a domestic institute is expected to produce future supplies.

Purpura Hypocoagulabilica.—At the University of Utrecht, J. Roos published a monograph on purpura hypocoagulabilica, which deals with the problem of why spontaneous hemorrhages occur in patients with diminished coagulability of the blood. Purpura hypo-

coagulabilica is seen in the presence of a deficiency of any of the coagulation factors. Spontaneous hemorrhages are seen even among patients in whom the normal coagulation factors are present but whose serum contains abnormal proteins that prevent the conversion of fibrinogen into fibrin or whose plasma exhibits a high fibrinolytic activity. There are only two factors common to all these disturbances of coagulation: decreased fibrin formation and a tendency to spontaneous hemorrhage. It might be concluded that a shortage of fibrin is responsible for purpura hypocoagulabilica. Comparing these pathological conditions with the normal situation, one arrives at the hypothesis that normal fibrin production contributes to the normal impermeability of the blood vessels for erythrocytes. The assumption that fibrin is formed continuously is supported by the observation that the proteins involved in coagulation are normally more intensively consumed by the body than other proteins. In addition, several investigators claim to have demonstrated that the coagulation factors (thrombin, convertin, heparin, and fibrinolysin) appear in circulating blood in an active phase.

Since no morphologic proof of this hypothesis was found in the literature, experiments were carried out to compare the morphology of the inner surface of rabbit aortas under conditions of normal coagulability with that obtained during decreased coagulability after the administration of bishydroxycoumarin (Dicumarol) or heparin. The experiments were made with the aid of the electron microscope. A comparison of aortic impressions made under conditions of normal and hypocoagulability revealed two points of discrepancy: 1. In all normal rabbits, fibrils were seen lying on the endothelium, usually between two nuclei, perpendicular to the borderlines of endothelial cells. For a number of reasons it was unlikely that these fibrils were artifacts. Their form and size did not differ from those of fibrin fibers. The most important argument, however, for equating these filaments with fibrin is that they were found only in 4 of the 14 rabbits with a decreased coagulability, and then only sporadically. 2. In normal rabbits, most endothelial cell nuclei protruded into the lumen. In rabbits whose blood had a decreased clotting power, most of the nuclei were flat. There were no differences between the rabbits treated with bishydroxycoumarin and those treated with heparin. Probably the flattened appearance of the nuclei in hypocoagulability was the result of a swelling of the cytoplasm of the endothelial cells. These observations indicate the probability that normally coagulation contributes in at least two ways to the impermeability of endothelium for red blood cells: by the deposition of fibrin fibers and by influencing the degree of swelling of endothelial cell cytoplasm.

Smoking and Lung Cancer.—The mortality figures for lung cancer and those for cigarette consumption are increasing continuously, whereas the total consumption of tobacco per capita is not on the increase. According to the Netherlands Central Bureau of Statistics, the total tobacco consumption per capita amounted to 3,061 Gm. in 1924 and 2,282 Gm. in 1955. The number of cigarettes smoked per capita was 346 in 1924 and 1,092 in 1955. The number of deaths from lung cancer in men (women in parentheses) was 58 (23) in 1924 and 1,767 (180) in 1955. In 1955 the death rate from lung cancer per 1,000 men in the age group 45 to 74 years was 1,113. In May, 1954, the government set up an advisory committee which reported to the director-general of public health in March, 1956. In March, 1957, he decided to release the report for publication (*Nederl. tijdschr. geneesk.* **101**:459, 1957). The commission concluded, on statistical grounds, that there is a connection between cigarette smoking and lung cancer. Other possible factors, which were likewise studied, proved to be less probably a cause of lung cancer than smoking. For this reason the Minister of Social Affairs and Public Health urges steps to restrain young people from smoking heavily and at an early age.

NEW ZEALAND

Virus Research.—At a meeting of the Otago Medical School Research Society, in May, Drs. R. G. Webster and J. A. R. Miles presented the results of an attempt to classify the contagious pustular dermatitis (CPD) virus in the pox group. CPD virus causes lesions in sheep similar to those of pox-group viruses in their natural hosts. Also, it is of a similar size to viruses of that group and, when examined under the electron microscope, is seen to have a similar brick shape to those pox viruses that have been examined. On the other hand, it will not adapt to growth on the chorioallantoic membrane of the embryonated hen's egg, and some previous investigations with the use of human convalescent serums and the complement-fixation test failed to show a relation between CPD and vaccinia viruses. Webster and Miles investigated comparatively the strain of CPD virus used to immunize sheep, the Gillard strain of vaccinia, and the Moscow strain of ectromelia virus; they used the complement-fixation reaction, Gispen's double-diffusion precipitation technique, and the neutralization test. Results showed that, in the complement-fixation test, cross fixation with CPD antigen was found only with concentrated serums against vaccinia and estromelia, but such fixation occurred with antigens diluted to 1:256. The antigen titer with the homologous antiserum was 1:4,096.

In the double-diffusion experiments, vaccinia and ectromelia showed a common precipitation zone with CPD. The zone corresponds with zone 3 of vaccinia or ectromelia against vaccinia antiserum (Gispen's notation for the bands was used). In the neutralization tests, there was no significant cross neutralization between vaccinia and CPD, but CPD antiserum gave substantial neuralization against ectromelia virus. The reverse did not hold, but the ectromelia antiserum was very weak in neutralizing activity against the homologous virus, and it is, therefore, not surprising that it failed to show activity against a heterologous virus. Webster and Miles believe that these results indicate a substantial relation between CPD and recognized pox viruses and that this virus should be included in that group.

Psittacosis.—Stocks of healthy birds may harbor psittacosis virus for long periods, but if they are exposed to overcrowding and adverse environmental conditions, as they often are when shipped between countries, many of them become sick and begin to shed the virus in their feces and many die. With the idea of trying to discover something of the nature of this upset, F. J. Austin (*Proc. Univ. Otago M. School* **35**:7, 1957) performed some experiments in mice that were carrying psittacosis virus latently in the spleen. The state of psittacosis carrier was induced in the mice by an intraperitoneal injection of 10^5 LD_{50} (median lethal dose) of the MOH 154 strain of psittacosis, followed two days later by a subcutaneous injection of 1 mg. of chlortetracycline. By this means, at least 60% of the mice were carrying the virus in their spleens one month later, when they were subjected to a number of treatments in an endeavor to upset the host-virus balance in favor of the latter. The following treatments were used: epinephrine, exercise (16 hours daily in a rotating drum), insulin, triple typhoid vaccine, cortisone, dinitrophenol, histamine acid phosphate, pregnancy, x-radiation, hyaluronidase, mucin, and synthetic diets deficient in choline chloride, nicotinamide, pantothenic acid, pyridoxine, riboflavin, or thiamin. Apart from the nicotinamide-deficient diet causing a large number of deaths in both carriers and controls, there were no deaths in the mice fed for one month on these diets. Of the other treatments, the only one that caused death in the carriers was cortisone (5 mg. subcutaneously on two successive days). Of the carriers so treated, 56% died within 10 days and virus was isolated from them all, but it was also possible to isolate virus from some of the other 44% after one month. There were no deaths in the controls.

By repeating the experiment and killing two mice every second day, the virus level in the spleen was found to rise by 1 log unit in the 10 days after injection of cortisone. No change was detected in the complement-fixing antibody level during this period. Killed homologous virus was injected intravenously into some carriers with the idea that it might cause a temporary lowering of the antibody level, thus allowing the virus to break through the host's resistance, but it had no such effect. It is likely that the carrier state is maintained by a critical antibody level and that the cortisone probably acts by lowering it to some degree and thus allowing the virus to multiply again in the spleen and spread to other organs.

Maintenance Therapy of Patients Who Have Undergone Adrenalectomy.—Woodruff and co-workers (*Australian & New Zealand J. Surg.* **26**:297, 1957) reported on the maintenance therapy of patients who have undergone adrenalectomy because of disseminated cancer of the breast. From a study carried on for over a year, they concluded that neither cortisone nor fludrocortisone acetate alone provides adequate steroid replacement in such patients: cortisone because its mineralocorticoid action is insufficient in comparison with its glucocorticoid action and fludrocortisone because the converse is true. By using both these steroids, a proper balance can be achieved. The dosage recommended is as follows: For the first adrenalectomy (combined or not with oophorectomy)—no corticoid replacement but with the patient under careful supervision during the postoperative period. For the second adrenalectomy—0.1 mg. of fludrocortisone and 20 mg. of cortisone on the evening before the operation; 0.4 mg. and 80 mg., respectively, in divided doses on the day of the operation; 0.2 mg. and 80 mg., respectively, on the second postoperative day; 0.2 mg. and 40 mg., respectively, on the third postoperative day; and 0.2 mg. and 30 mg., respectively, from the fourth day on. Slight readjustment of this dosage may be required as determined by the clinical state of the patient and by periodical estimations of the sodium-potassium ratio in 24-hour collections of urine and of the fasting blood sugar.

If, at the time of the first adrenalectomy, it is suspected that the patient has adrenocortical metastases, which have resulted in impaired cortical function, it is advisable to give 0.2 mg. of fludrocortisone and 30 to 40 mg. of cortisone from the day of the first operation because of the risk of producing acute adrenocortical deficiency if the gland removed happens to contain most of the patient's functioning cortical tissue. After the second adrenalectomy, the dosage is changed to conform to the schedule discribed above.

Retropubic Repair of Urethra.—Complete rupture or rupture-dislocation of the deep urethra is uncommon and often associated with multiple injuries. Always, except in the case of missile injuries, it is associated with some type of fracture of the pelvis. Conventional treatment consists of secondary repair of these injuries treated primarily by the traditional method of catheter splintage. Dr. W. R. Carswell (*Australian & New Zealand J. Surg.* **26**:308, 1957) found that treatment by the standard method is limited and unsatisfactory and has successfully performed primary repair by the retropubic route. One difficulty of primary repair is elimination of the gap which may be 3 in. between the ends of the urethra. Catheter splintage, on retropubic examination of the pelvis, does not allow accurate apposition of the two ends. The dislocated proximal urethra, prostate, and bladder may be found floating on an extraperitoneal collection of blood and urine or, if this is small, will be found grossly displaced upward and backward, with the bladder and prostate acutely anteverted. Other difficulties are prevention of infection, extravasation, and persisting dead space due to failure to restore the normal structure. The retropubic primary reconstruction of the urethra involves: (1) a skin-crease incision across the lower part of the abdomen, two finger widths above the pubis, dividing both rectus muscles and splitting the oblique muscles after ligature of both deep epigastric arteries; (2) exposure and hemastasis by packing and ligature aided by the light of a cystoscope; (3) restoration of bladder and prostate to their normal position; and (4) drainage and closure. The catheter is removed in 10 days. In a patient operated on in this way, there was a normal stream of urine from the time of removal of the catheter and a sound passed without obstruction. Rectal examination was normal. The patient was up and about with a stable fracture of the pelvis.

SWEDEN

Care of Tuberculous Patients.—An article by Dr. Sven Löfgren in *Nordisk medicin* for April 11, shows how great are the changes taking place in the care of tuberculous patients. Toward the end of 1956, only 4,600 of the 7,385 beds for such patients in Sweden were occupied by the tuberculous; 38% were empty or occupied by nontuberculous patients. Several sanatoriums are now using many of their beds for patients with chronic diseases, tuberculous or otherwise. With the near prospect of tuberculosis ceasing to be a widespread and serious disease, many young physicians are reluctant to specialize in this subject. Many junior staff appointments in institutions for the tuberculous are therefore vacant. In 25 of Sweden's 40 sanatoriums, one or more such positions are vacant. A system of readjustment is being put into force with the closing of many sanatoriums, whose location had entailed more or less effective isolation from other hospitals. The work of about 25 such isolated sanatoriums is now being taken over by pulmonary disease departments of general hospitals. An article in the same issue by Dr. Gunnar Dahlström shows how great has been the shift from one type of operation to another in the treatment of pulmonary tuberculosis. In the period 1948 to 1955, the number of intrapleural pneumothorax inductions fell from 171 to 39. In the same period there was a fall in the number of cauterizations of pleural adhesions from 131 to 29. The number of cases of extrapleural pneumothorax fell from 24 to 11 and the number of thoracoplasties from 62 to 43. The greatest change in the other direction concerns lung resection, which was undertaken only in one patient in 1948, whereas 139 resections were performed in 1955. Dahlström has made follow-up examinations of the 133 patients on whom thoracoplasties and the 260 on whom resections were performed in 1953 and 1954. Nearly half these patients were over the age of 35 years—proof of the current upward age shift of pulmonary tuberculosis.

UNITED KINGDOM

Agranulocytosis After Tranquilizer.—An inquest was held after a 43-year-old woman had died of agranulocytosis after treatment in a mental hospital with pacatal (Pecazine), a tranquilizer. The coroner stated that this drug, freely obtained from drugstores, could damage the bone marrow. In his opinion it should be given only to patients who are psychotic, and only when other forms of treatment have failed. A pathologist testified that blood tests made during treatment gave a false sense of security, since effects on the bone marrow could appear suddenly. Because so little is known about the drug, it should not be used in general practice. The dosage given to this patient was not excessive and there was no reflection on the medical staff.

Physician Penalized.—The Minister of Health has decided to withhold $3,080 from the remuneration of a physician for breaches of regulations. This was one of the highest penalties imposed on a physician by the Minister. From June, 1955, to March, 1956, the physician issued prescriptions to the value of $744 to patients not in the National Health Service or whose names could not be deciphered on the prescription forms. Although, in some cases, the forms were issued by his partners, the physician was held responsible. He attributed the breaches to carelessness and not wilfull transgression.

Physicians to Give Evidence to Commission.—The British Medical Association will give evidence to the Royal Commission on remuneration to physicians, but the dispute with the government is not ended. Dr. Solomon Wand, chairman of the British Medical Association council, has called it an armed truce. The quarrel with the government is over rejection of a claim for a pay increase of 24%. The decision to give evidence should not be regarded as a sign of weakness. If this dispute is not resolved in an acceptable way, vigorous action may still be taken. A motion that all future negotiations on remuneration should be conducted by the council on behalf of the profession as a whole was carried. Hitherto, separate committees have acted on behalf of the consultants and the family physicians. The decision to give evidence to the commission was made conditional. An amendment was carried to the effect that evidence should be given, with the understanding that it not show prejudice in favor of the profession's right to press for fulfillment of the government's moral obligations. This could be interpreted as action in the courts to test the validity of the Spens report. The physicians claim that this report entitles them to be reimbursed for the fall in the value of money since 1939. The government disagrees.

Asian Influenza.—Sir Macfarlane Burnet, the Australian authority on virus diseases, said, in London, that he thought the new Asian influenza would be dominant for the next 5 to 10 years and would spread over the world. History suggests that every 5 to 10 years the influenza virus changes its character. It did so in 1918, 1929, probably in 1935, and in 1946-1947. Sir Macfarlane's own laboratory vaccinated him against the new virus. Australian laboratories expect to have commercial quantities of the vaccine available in readiness for the coming Australian winter. As it is impracticable to vaccinate an entire population, in Australia the vaccine will be used for customs officials, nurses on hospital staffs, and others who contact travelers.

A British vaccine has been developed that, it is believed, will protect against the new Asian influenza caused by a virus previously unknown. It must be tested before large-scale production can begin, and it will be injected into volunteers, including physicians and medical students. It was prepared by Dr. F. Himmelweit and his staff at the Wright-Fleming Institute. Specimens of the new virus were flown from the Far East to the World Influenza Center in London. Dr. Himmelweit said: "We hope to have supplies of vaccine ready for use if outbreaks of the new influenza should occur in this country in the winter."

THE LEISURE CORNER

MOUNTAIN CLIMBING

Nothing is more refreshing than to obtain a glimpse of nature first hand. The more nature tries to conceal some aspect of herself, the more curious most of us become. What, you may ask, is the lure that draws about a million people each year out of a comfortable way of life to face discomfort and danger, so that they may laboriously climb a few hundred or a thousand feet up the side of a mountain? The uncompromising fact is that danger itself attracts few people; actually, most are repelled by it. Yet the persons who enjoy climbing mountains experience the same exhilaration that physicians do after overcoming a difficult medical or surgical problem.

The attitude of mountain climbers toward the pastime has undergone a number of curious changes. Ancient peoples, for instance, looked on mountains with indifference. Throughout the Middle Ages mountains were regarded with fear and terror; for centuries, no one ventured to climb even their lowest peaks. During the past century, however, men have lost their fear and have discovered courage and ambition to climb mountains. Today, mountain climbing is regarded neither as a daring, dangerous adventure nor as a unique opportunity for exploration. For millions of people the world over, mountain climbing merely provides one of the hardier forms of outdoor sports.

More than 250,000 mountain climbers are presently enrolled in the Alpine clubs of Europe alone. Participants do not subscribe to a "take-it-easy" philosophy. Virtually all of them do some climbing every season, while thousands regularly assault the most difficult peaks. A generation ago, climbing the Matterhorn or Mont Blanc made front-page news; now, at least 100 climbers attain the ultimate peaks of each of these mountains every season.

Switzerland attracts thousands of mountain climbers from all parts of the world because of the Alps. It is not uncommon for hotels to be built with infinite pain in altitudes well over 10,000 ft. to accommodate such guests. So great has the rush been to the mountains that extremely modest huts and cow barns are used to shelter the overflow of enthusiastic mountain climbers. American mountains offer an irresistible appeal to mountain climbers. Innumerable virgin peaks in the Far West are yet to be explored.

Mountain climbing may be divided into two general classes—low climbing and high climbing, with the dividing line, or, more accurately, the elevation, that separates the two classes placed at 10,000 ft. Mountains of the so-called low class include the White Mountains, the Adirondacks, and the ranges in the Carolinas. Here, mountain activity will appeal to the run-of-the-mill summer visitor, with no serious dangers presented.

In high mountain climbing, clothes and equipment are of vital importance. Faulty clothes and incorrect equipment not only are a serious inconvenience but can indeed cause unnecessary suffering, as well as loss of life. A proper climbing suit is made of special cloth, warm for its weight, and waterproof. The fabric must be strong enough to avoid tearing when stretched across jagged rocks. The shape of the suit is unimportant as long as it permits free movement. It should have pockets large enough to hold various supplies, since both hands are required almost continuously for climbing. The coat should be cut in such a way that it can be tightly buttoned about the neck; should the occasion demand, the collar can be turned up to protect the ears. A special form of mountain boot is available with stout upper parts, heavy soles, and nails or cleats for snow and ice climbing. Shoes designed for city wear would fall apart quickly under the stress of climbing. Heavy woolen socks should be worn to guard against freezing. The hat should fit the head snugly enough to defy a hazardous storm and should have folds that can be turned down over the ears. Many amateur climbers venture forth in sartorially trim sport suits and shoes, often to return to their base of operations practically barefoot, with the seats of their trousers attached to jagged rocks as testimony to improper preparation for mountain climbing.

An Alpine scarf is a useful article of dress for this type of adventure. It should be about 6 ft. long and consist of heavy, warm material. A scarf has several functions: in cold weather, it makes a good comforter; with a few skillful turns, it can serve as a warm head protector; when wound around the body, it supplements a sweater; and, when not required for any of these purposes, it may be wound around the waist as a belt.

The provisions carried by the mountain climber depend strictly on his individual preferences and tastes. Certainly, no specific menu is suitable for all climbers. In general, the dry air found at high altitudes will frequently cause intense thirst. Under these circumstances, only tea and coffee are recommended as suitable thirst-quencers. Some guides carry wine and liquor, but the effect of alcohol under unusual atmospheric conditions at high altitudes is likely to be adverse.

The impact of bright sunlight on great expanses of snow and ice makes snow-blindness a real threat. To circumvent this, many types of glasses have been designed for climbers. Another form of hazard comes as sunburn. This can be avoided by painting the face with an appropriate anti-sunburn preparation, utilizing soot or charcoal as a base. Although the appearance of the climber may be somewhat startling, the face will be protected from the sun's rays.

A specially designed rope is the lifeline of every mountain climber. It contains three strands, which are made of fine manila hemp to resist damp and rot. The rope is readily recognized by a red streak of woven worsted which traverses its entire length. The Alpine rope is not, as some people imagine, a tether to prevent the climber from wandering off and becoming lost. A rope, when properly adjusted, will put an entire party of mountain climbers on equal terms. This enables each climber to distribute the advantage of his position and to share his strength with every other member of the party. The safety of one and all depends on an equitable marshalling of individual resources. In rope work, the most dangerous positions are held by the best and most experienced climbers. In

very dangerous places, climbers will move one at a time, with others clinging to their respective positions in order to resist any unexpected tug or jerk caused by a fall or slip of one of the members of the party. Should two men fall at the same time, all may be dislodged.

Not all Americans are aware that the Rocky Mountains are vastly greater in area than the Alps, scattered as they are throughout Europe. The Alps for generations have been associated with intense mountain climbing. More recently, a younger generation of American climbers has discovered the awe-inspiring challenge of our own mountains. In Montana and Wyoming alone there are scores of peaks rising from 10,000 to 13,000 ft. in height, while Pike's Peak reaches 14,000 ft. in altitude.

Probably there is no other great snow-covered peak in the world that is visible to so many people as Mount Rainier in the state of Washington. This is the only mountain where women guides are available to assist women. Although Mount Rainier is a volcano, its crater has long been inactive, its bowl-like formation being filled with ice and snow. Deep fissures extend far down into the heart of the mountain. When snow melts, it flows down to meet the internal higher temperature of the mountain, where it boils quickly, coming up in the form of steam. Parts of the crater often attain a temperature of 150 F.

Perhaps no mountain in the world is more familiar by name than Mount Ararat in Armenia. Mount Ararat not only is higher than Mont Blanc, the highest point in Europe, but also has the added advantage of having been the setting for many dramatic mountain-climbing adventures. According to the Scriptures, Noah's Ark came to rest on Mount Ararat, whose peak attains a height of 17,260 ft. The legend still persists that fragments of the Ark are to be found on its peak. Ancient belief holds that Noah built a vineyard below the snow line of Mount Ararat, a site where he lies buried. At any event, the biblical interest attached to this mountain has prompted many climbers to attempt its ascent.

Those who climb Mont Blanc or the Matterhorn, as well as other famous mountains, are eloquent in their praise of beauteous wonders to be seen from their peaks. Today, still and motion-picture cameras especially designed for mountain photography form an essential part of the equipment of mountain climbers. Photography has brought the spirit of mountain climbing to many people who hitherto had never appreciated the breath-taking beauty of mountainous terrain.

MEDICAL FILM REVIEWS

Value of Succinylcholine Chloride in Electroconvulsive Therapy and Laryngospasm: 16 mm., color, sound, showing time 10 minutes. Prepared by George J. Thomas, M.D., Pittsburgh. Produced in 1955 by Mervin LaRue, Inc., Chicago, for and procurable on loan from Abbott Laboratories, North Chicago, Ill.

The purpose of this film is to show electroconvulsive therapy with and without the use of amnesic and muscle-relaxant agents. It shows the value of thiopental sodium in accomplishing light anesthesia and amnesia and of succinylcholine chloride in reducing the severity of convulsive contracture of skeletal muscles. The film also shows mild and severe laryngospasms and the ease of relieving these conditions with the administration of succinylcholine chloride intravenously. This motion picture is quite good; however, the dosage of thiopental mentioned in the film is thought, by some, to be excessive. The film is recommended for all neurologists, psychiatrists, anesthesiologists, nose and throat surgeons, and interns and residents.

Teeth: Their Structure and Care: 16 mm., color or black and white, sound, showing time 11 minutes. Educational Collaborator: J. Robert Schumaker, D.D.S., Northwestern University Dental School. Produced in 1956 by and procurable on rental or purchase from Coronet Instructional Films Inc., Coronet Building, Chicago 1.

The purpose of this film is to show high-school students the structure and function of the teeth, to motivate interest in proper dental care, and to indicate how and why such care should be practiced. After neglecting regular dental care for two years, a recurring pain prompts Dave to visit his dentist. The audience sees, through animation, the function of different teeth, the structure of a tooth, and the way in which decay spreads. Dave and the audience are motivated to care for the teeth as a means of insuring dental health. In general, this is an excellent film, and every effort has been made to have it completely authentic. The black-and-white diagram of the teeth is very good; however, the animation sequences showing the infection of a molar tooth are not well done. In two places, the relationship of candy to cavities is mentioned, but the explanation, in both instances, is a little too simple. The photography is good and the narration is clear and utilizes a minimum of words to make important points. The film is recommended for students in junior and senior high school.

Modern Concepts of Epilepsy: 16 mm., color, sound, showing time 24 minutes. Prepared by Francis M. Forster, M.D., and Bushnell W. Smith, M.D., Washington, D. C. Produced in 1956 by Sturgis Grant Productions, New York, for and procurable on loan from Ayerst Laboratories, 22 E. 40th St., New York 16.

This film demonstrates the cortical differences between normal persons and epileptic patients and presents good demonstrations of actual cases of grand mal epilepsy, petit mal epilepsy, the clinical Jacksonian seizure, and psychomotor epilepsy. Treatment by the various anticonvulsant drugs is also covered, although amounts for individual dosages are not mentioned. The film reveals, through case histories, that epilepsy is a controllable condition when diagnosed and treated with full reference to the patient and his environmental situation. This superior film is well organized and well illustrated. It clearly presents and illustrates convulsions. The presentation of subject matter, photography, and narration are extremely good. It is highly recommended for general practitioners, pediatricians, house officers, medical students, and nurses.

MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

Atypical Syndromes in Hyperthyroidism. M. G. Wohl and C. R. Shuman. Ann. Int. Med. **46**:857-867 (May) 1957 [Lancaster, Pa.].

The authors report on 6 patients with atypical syndromes disguising hyperthyroidism. Relative bradycardia occurred in the first patient, a 58-year-old man with congestive heart failure that was unresponsive to digitalis given for 7 months. Nausea and burning eructations developed after the withdrawal of digitalis. Symptoms of coronary artery insufficiency were absent, although the electrocardiogram revealed evidence of an old posterior myocardial infarct that may have involved the focus of impulse formation, making it resistant to the usual acceleration seen in thyrotoxicosis. Rapid recovery from the thyrotoxic heart disease occurred in the patient within 3 months after treatment with antithyroid drugs was instituted, and nausea and flatulence disappeared on return to euthyroid status. The second patient, a 32-year-old woman, had acute abdominal pain, auricular fibrillation, and precordial pain associated with thyrotoxicosis. Mitral valvular disease was suspected and arrangements for gallbladder surgery were instituted because of the typical aspect of cholecystitis, but the patient's acute toxic manifestations suggested thyroid storm and she was treated with propylthiouracil. Marked improvement was observed within 2 weeks. The mechanism of abdominal pain and of the palpable tender mass in her right upper abdominal quadrant may have been acute enlargement of the liver due to congestion. By recognizing thyrotoxicosis, an unnecessary operation was avoided and appropriate treatment led to correction of the condition.

Congestive heart failure obscured the underlying metabolic disorder in the third patient, a 35-year-old man with thyrocardiac disease. Prompt improvement resulted from administration of 7.7 μc. of radioactive iodine over a period of 4 weeks. Marked palpebral edema and the absence of a palpable thyroid gland in the presence of severe thyrotoxicosis were the significant features in the 4th patient, a 38-year-old man in whom the cardiac, renal, and biochemical findings failed to explain the edema. With antithyroid medication and improvement in the patient's metabolic status, the signs of thyrotoxicosis disappeared and, simultaneously, the edema rapidly cleared. Subsequently, when administration of strong iodine (Lugol's) solution was discontinued, the signs of thyrotoxicosis appeared and marked periorbital edema returned. Chronic thyrotoxic encephalopathy with prolonged disorientation and stupor and associated with convulsive seizures was observed in the 5th patient, a 23-year-old woman who had been admitted to a neurosurgical ward. Marked improvement resulted from intensive antithyroid treatment with strong iodine solution, methimazole (Tapazole), diphenylhydantoin (Dilantin) sodium, and phenobarbital to suppress the convulsions. The last patient, a 37-year-old woman, had myasthenia gravis combined with thyrotoxicosis. Treatment of thyrotoxicosis with strong iodine solution lessened the severity of the myasthenia and improved the response to neostigmine.

Patients with hyperthyroidism, the usual signs of which were lacking, and whose presenting signs and symptoms were referable to the cardiovascular, gastrointestinal, or nervous central systems, thus, were treated unsuccessfully for months without the suspicion arising that the real cause was an overactive thyroid gland. Painstaking scrutiny of the patient, with the aid of appropriate laboratory studies, revealed the underlying thyrotoxicosis, and proper treatment brought about amelioration of symptoms and complete recovery. These cases emphasize the necessity for a constant awareness of the protean nature of thyrotoxicosis.

Esophageal Ulcer in the Adult: Clinical Aspects and Experiences with Conservative Treatment. E. D. Palmer. A. M. A. Arch. Int. Med. **99**:695-700 (May) 1957 [Chicago].

Esophageal ulcer has a reputation for seriousness due to the constant threat of hemorrhage and perforation. A radical operation is considered by some to be needed by most patients with such ulcers. Twenty-three patients with primary esophageal ulcer were observed for varying periods during and following treatment. They were selected by the single criterion that therapy was conservative. The frequency of associated diseases, especially gastroduodenal ulcer, hiatal hernia, and subacute erosive esophagitis, was notable. The main symptoms believed ascribable to esophageal ulcer were weight loss, dysphagia, and bleeding. Diagnosis by esophagoscopic examination was more efficient than that by roentgenologic study. Treatment consisted of oral administration of bismuth subcarbonate, periodic esophageal dilatations, and, in some patients, interview therapy. All of the ulcers were followed to proved healing, and this required about 4 weeks. Nine patients lost their symptoms quickly and had no recurrence. Nine had recurrent symptoms for a few weeks after ulcer healing, and 5 continued to have recurrent symptoms, believed ascribable to persisting disturbances in esophageal motility. Three of

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The place of publication of the periodicals appears in brackets preceding each abstract.

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the latter had electocardiographic signs of pericarditis. The objective results of treatment were good in all cases. No strictures developed.

Conservative management is not recommended as a routine approach to primary esophageal ulcer because of the danger of complications, particularly severe hemorrhage and perforation. Complications are a consequence of therapeutic neglect, and it is demonstrated that, when an esophageal ulcer is diagnosed prior to any major complication other than hemorrhage, simple but vigorously applied medical treatment produces satisfactory results. The main late complication of healing—stricture formation—can be prevented if dilatations are made part of the treatment.

Results of Anticoagulant Therapy in 1,400 Patients with Mitral Valvular Disease. J.-L. Beaumont, E. Moeri and J. Lenègre. Arch. mal. cœur **50**:225-236 (March) 1957 (In French) [Paris].

The purpose of these observations was to see whether prolonged medication with anticoagulants, assumed to be effective in preventing recurrent embolism in ambulant patients with mitral cardiopathy, might also be effective in preventing recurrent embolism in patients hospitalized with this condition. The study involved 1,400 patients who entered the hospital either for examination or because of complications in connection with disease of the mitral valve. The anticoagulants used were heparin, phenylindanedione, dicumarine ethyl ester, and G. 23350 (J. A. M. A. **158**:1143 [July 23] 1955). These were given prophylactically to 753 patients, including 113 who were being prepared for commissurotomy but were suspected of having thrombi in the left auricle, 267 exposed to the danger of embolism during treatment of auricular fibrillation with digitalis and hydroquinidine, and 362 with right ventricular insufficiency, which was the immediate consequence of catheterizing the chambers of the right side of the heart. These 3 groups were matched against groups of 258, 69, and 358 patients, respectively, who had the foregoing conditions but did not receive anticoagulant therapy.

Those patients who were treated with anticoagulants for periods of 8 days or more had a mortality of only 1.5% as compared with 6.6% for the reference group, and their rate of thromboembolic complications during the period of hospitalization was 1.2% as compared with 7.08% for those not receiving anticoagulants. Similarly, there was evidence that anticoagulant therapy reduced the incidence of fresh thromboses after commissurotomy from 50% to 14.2%, the incidence of embolism during the digitalis-hydroquinidine defibrillation program from 5.7% to 0.37%, and the incidence of thromboses during treatment for right ventricular insufficiency from 9.4% to 1.6%.

Offsetting some of the advantages of anticoagulant therapy was the occurrence of hematuria, rectal bleeding, hematomas at the site of intramuscular injections, nosebleed, hemoptysis, and, in 3 instances, cerebral hemorrhage. These complications were generally benign but proved fatal in 3 patients (0.39%). Two deaths from cerebral hemorrhage, however, occurred also among patients not treated with anticoagulants. There was 1 death from heparin shock. The data showed that the prophylactic use of anticoagulants in patients with mitral disease is effective if the above indications are observed and if the condition of the patient is closely followed by clinical and laboratory tests.

Cardiovascular and Renal Complications of Cushing's Syndrome: A Clinical and Pathological Study of 17 Cases. D. A. Scholz, R. G. Sprague and J. W. Kernohan. New England J. Med. **256**:833-836 (May 2) 1957 [Boston].

A study of the lesions of the cardiovascular and renal systems of 17 patients with Cushing's syndrome was made, and autopsies were performed. There were 15 women and 2 men, ranging in age from 15 to 52 years. Only 2 of the patients were more than 40 years of age. A significant elevation of blood pressure had been present in all 17 patients. Hypertension developed, in general, in patients in the younger age group. Cardiac enlargement, indicated by increased weight of the heart, was present in 15 patients. The largest hearts were found in patients, in whom hypertension was most severe and prolonged. Congestive heart failure occurred in 9 patients. Of these, 3 died of cardiac failure with pulmonary edema and had severe hypertension and pronounced cardiac enlargement. In 8 patients changes in the arterioles of the kidneys, liver, pancreas, and skeletal muscles occurred, that could not be differentiated from the lesions of the arterioles frequently found in so-called essential hypertension. Renal calculi, nephrocalcinosis, or both, were present in 11 patients, and 8 of these also had osteoporosis. Special emphasis is placed on the severity and duration of the hypertension in relation to the onset of other symptoms and on the seriousness of Cushing's syndrome from the standpoint of changes in the cardiovascular systems and the kidneys of a relatively young group of patients.

The Effect of Ventricular Rate on the Blood Pressure of a Patient Treated with an External Artificial Pacemaker. A. H. Douglas. New York J. Med. **57**:1595-1598 (May 1) 1957 [New York].

An external artificial pacemaker as first described by Zoll in 1952 consists of an electric circuit that produces repetitive stimuli of varying voltage and frequency. Electrodes resembling those used in electrocardiography are applied to the external chest wall, the stimulating electrode being applied in the region of the cardiac apex and the indifferent electrode in the right pectoral region or on the posterior thoracic wall behind the stimulating electrode. With the use of such a pacemaker, one can vary the patient's ventricular rate at will. The author describes the use and effect of this external pacemaker in a 65-year-old man who was hospitalized because of syncope associated with a slow heart rate. During his hospital stay, the patient had frequent Stokes-Adams seizures. Because of long periods of ventricular standstill, an artificial pacemaker was applied, and its use was required intermittently for 11 days. It was effective at all times. For

4 days thereafter, the patient was independent of the machine, but then arrest recurred. Once more he responded to the electric stimuli, but 4 days after his last use of the artificial pacemaker, he was found dead as the result of suicide; he had insulated the stimulating electrode by placing gauze between the electrode and the chest wall.

When an artificial pacemaker is used to treat ventricular arrest, the systolic and pulse pressures fall as the rate is increased. The diastolic pressure remains relatively stationary. With ventricular rates in excess of 100 per minute, the blood pressure levels may be unobtainable. It is recommended that a rate of 50 per minute be used when electric stimuli are applied to the external chest wall. This relatively slow rate has been shown to be effective and has the added advantage of minimizing the distress caused by pectoral muscle contraction. A similar rate is probably desirable when the exposed heart is stimulated directly or massaged manually. The hypotension produced by a rapid rate associated with a fixed venous return to the heart and an unaltered peripheral resistance can explain the blood pressure fall occasionally found in paroxysmal tachycardia. Therapy must be directed to slowing of the ventricular rate, and the use of a pressor amine is not indicated unless there is evidence of peripheral vascular collapse.

Clinical Significance of Oxygen Removal. J. C. Kovach and G. Morales. J. Thoracic Surg. 33:690-697 (May) 1957 [St. Louis].

Cardiopulmonary studies with particular reference to the oxygen removal rate were made in 21 surgical patients, 8 women and 13 men, between the ages of 16 and 70 years. Of these 6 had mitral stenosis, 1 had aortic stenosis, 3 had pulmonary tuberculosis, 5 had primary or secondary cancer of the lung, 1 had bronchiectasis, 1 had pulmonary artery severance, 1 had pulmonary embolism, 1 had benign teratoma, 1 had benign ganglioneuroma, and 1 had mediastinal torsion. The oxygen removal is the amount of oxygen in milliliters that is removed from 1 liter of respired air. The normal removal rate at rest is 40 ml. per liter of ventilation and during exercise is 60 ml., an increase of 50%. Normal ventilation rates during rest and exercise are assumed to be 5 and 15 liters per minute for an average man.

Right ventricular damage, which may be unrecognized per se, revealed itself as a diminished oxygen removal in the patient with bronchiectasis and in 1 patient with pulmonary tuberculosis. This diminution was even more marked on exercise. Malignant lesions, by intraluminal neoplastic invasion or unyielding extraluminal compression, resulted at rest in a decreased oxygen removal, which further decreased with exertion. Pulmonary arterial obstruction from benign lesions did not cause a further decrease in the oxygen removal on exercise, because the increased ventilatory movement on exertion together with the increased cardiac output was able to by-pass effectively this "benign obstruction" and the oxygen removal increased with exercise. Secondary pulmonary metastatic lesions acted similarly through their method of spread, first growing near small vessels and so not obstructing much of the blood flow. An extreme shift of the mediastinum with tension and deflection of the vena cava or pulmonary arteries also resulted in a diminished oxygen removal, which decreased still further with exercise. The cause was usually obvious, such as a large aneurysm, thoracoplasty, and localized pulmonary contracting fibrosis. The inflexibility of the causative agent resulted in this phenomenon. Parenchymal disease affected perfusion and ventilation proportionately so that the oxygen removal did not change with exertion even if it was somewhat decreased at rest. Valvular disease and right-sided and/or left-sided myocardial disease caused a decreased oxygen removal at rest. The reaction to exercise varied with the status of the myocardium and hemodynamics. The oxygen removal is a good index of the myocardial reserve. Oxygen removal is tested easily and, when fully interpreted, is helpful in diagnosis and as part of a study to assess cardiopulmonary function, since it depends on both.

Placebo in the Treatment of Rheumatoid Arthritis and Other Rheumatic Conditions. E. F. Traut and E. W. Passarelli. Ann. Rheumat. Dis. 16:18-21 (March) 1957 [London].

The effect of placebo tablets was studied in 88 patients with rheumatic arthritis. Fifty-one of them were given the tablets for 4 weeks or less; 13 were found to have improved. Of 37 patients who were treated continuously or progressively, 31 improved for from 2 to 20 months. The number of patients benefiting from placebos is about the same as that of those favorably influenced by methods of therapy reported in other studies. Patients with degenerative arthritis, 4 with psoriatic arthritis, 6 with gouty arthritis, 10 with low back ache due to involvement of the soft tissues, and 18 with shoulder syndromes, had about the same response to placebo as those with rheumatic arthritis. Placebo has been long recognized as an important factor in the results of physician-patient contacts. An unrecognized placebo effect plays a great role in the treatment of the chronic diseases characterized by remissions. Controls are particularly necessary in the evaluation of the treatment of joint diseases, because of the fluctuating character of these diseases and the many factors influencing them. The conditions of patients benefited by the giving of placebo did not appear to be essentially altered by resorting to therapy with salicylates or cortisone. The number of patients who improved justifies the continuation of placebo administration.

Pernicious Anemia Without Gastric Atrophy and in the Presence of Free Hydrochloric Acid: Report of a Case. J. N. Harris-Jones, H. T. Swan and G. R. Tudhope. Blood 12:461-468 (May) 1957 [New York].

The case of a 16-year-old girl having pernicious anemia with free hydrochloric acid in the stomach aroused great interest due to its rarity. It is difficult to prove that a patient who has a megaloblastic marrow and who made an excellent response to vitamin

B_{12} therapy has been suffering from the results of deficient secretion of intrinsic factor. There was no evidence of malabsorption of fat or folic acid, of intestinal lesions, or of nutritional deficiency. Gastric juice was deficient in intrinsic factor. The patient absorbed subnormal amounts of cobalt^{56}–labeled vitamin B_{12} when this was given alone by mouth, but normal absorption occurred when the labeled vitamin B_{12} was given either with intrinsic factor or 15 minutes after an injection of carbachol. One may conclude that deficient intrinsic factor production in this patient led to failure of absorption of vitamin B_{12}, resulting in a megaloblastic anemia, which can be called Addisonian pernicious anemia. The patient had normal gastric mucosal histology. It is suggested that gastric atrophy of pernicious anemia might result from prolonged subclinical vitamin B_{12} deficiency, secondary to failure of intrinsic factor secretion. A deficient production of intrinsic factor may occur at a time when the gastric mucosa is otherwise normal both histologically and functionally.

Steroid Therapy in Mumps Orchitis. G. W. Zeluff and T. J. Fatherree. Ann. Int. Med. **46**:852-856 (May) 1957 [Lancaster, Pa.].

The authors describe 4 cases of mumps orchitis in men aged 37, 27, 19, and 50 years respectively. The first patient was given hydrocortisone in doses of 20 mg. 4 times a day. The second and the third patients were given prednisone orally in doses of 5 mg. 4 times a day. The 4th patient received 20 mg. of corticotropin intramuscularly every 6 hours. A rapid remission was noted within 48 hours in all the patients, with a dramatic reduction in the local inflammation as well as in generalized systemic effects. It is suggested that all patients with mumps orchitis be treated promptly with steroids except in the presence of the usual, unrelated contraindication to this form of therapy.

Actinomycosis: Its Recognition and Treatment. J. C. Harvey, J. R. Cantrell and A. M. Fisher. Ann. Int. Med. **46**:868-885 (May) 1957 [Lancaster, Pa.].

Of 37 patients, 26 men and 11 women, between the ages of 19 and 66 years, with actinomycosis, the anatomic location of the primary lesions was in the cervicofacial tissues in 9, in the lungs in 5, and in the abdominal tissues in 23. The occupations of the patients varied greatly. There was no seasonal factor in the onset of the disease. The diagnosis was established either by culture of the organism from the site of infection or by microscopic identification of the organism in the biopsy specimen. Of 91 secondary lesions identified in the 37 patients, 50 involved the abdominal wall or viscera, 21 involved the thoracic wall or viscera, 12 were situated in the cervicofacial region, and 8 were in various other locations. The treatment in this group of patients varied. Before 1945 no currently regarded specific treatment was given to any of these patients. Iodides were routinely administered to all patients; a few patients were given thymol; irradiation of lesions was tried in a few patients; and surgical drainage of abscesses was performed occasionally. Since 1945 all patients received penicillin as a specific treatment for the infection. In the earlier patients the dose of penicillin varied from 300,000 to 1,000,000 units a day. It is now standard practice to give 10,000,000 to 20,000,000 units of penicillin a day intravenously in a continuous drip. After an initial period of 30 to 45 days of antimicrobic therapy, wide surgical excision of the infected tissues was performed. In lesions involving the superficial structures, the wound was packed open and allowed to heal by secondary intention. After the operation, 2,000,000 to 5,000,000 units of penicillin were given intramuscularly every day for 12 to 18 months. The last 2 patients treated were given phenoxymethyl penicillin (penicillin V) in doses of 5,000,000 units daily, by mouth.

Of the 37 patients, 31 were adequately followed, 14 recovered, and 17 died. Of the 21 treated before 1945, 13 (62%) died, the disease progressed in 5 (24%), and 3 (14%) were cured. Of the remaining 16 patients who were treated after 1945, 4 (23%) died and 12 (77%) were cured. Of the 37 patients, 17 were treated with general supportive measures only and none of these were cured; of 4 treated by excision of infected tissues, 2 were cured; of 7 treated with penicillin only, 4 were cured; and, of 9 treated by excision and penicillin, 8 were cured. The preferred treatment of actinomycosis is a combination of massive, long-term administration of penicillin and wide surgical excision of infected tissues. With this combined therapy the cure rate in this infection has been raised to 88% in the last 5 years.

A Case of Afibrinogenemia. P. B. Fernando and B. D. Dharmasena. Blood **12**:474-479 (May) 1957 [New York].

Complete and permanent absence of fibrinogen is found only as a congenital abnormality. This rare condition affects males more frequently than females; 16 of 23 patients with afibrinogenemia reported on in the literature were males. The bleeding tendency made its appearance in all patients in early life. Consanguinity of parents or grandparents has been noted in 9 and hemorrhagic diathesis in the relatives of 7 patients. Spontaneous bleeding is unusual. Six patients died in infancy or childhood due to excessive bleeding from trauma. The bleeding time shows wide variations.

Congenital afibrinogenemia occurred in a 22-year-old Singhalese admitted to hospital with severe abdominal pain of 2 days' duration. The principal features of the disease in this patient were the total absence of fibrinogen in the blood, noncoagulability of blood, history of several episodes of hemorrhage dating from infancy, low erythrocyte sedimentation rate, consanguinity of the parents, and the occurrence of spontaneous hemoperitoneum, from which he recovered after operation. Treatment consisted of replacement transfusion with fibrogen or blood, combined with antishock therapy such as saline infusion, bed rest, and sedation. Patients with afibrinogenemia have usually a poor prognosis. This patient is the oldest of all reported on; he is leading an active life. Although blood transfusion doubtlessly saved his life on this occasion, he had survived several episodes of

bleeding. The vascular mechanisms concerned in hemostasis apparently are as important for preservation of life as the coagulation of blood.

The Hypoglycemic Response to Insulin in Man After Sulfonylurea by Mouth. I. A. Mirsky and D. Diengott. J. Clin. Endocrinol. 17:603-607 (May) 1957 [Springfield, Ill.].

Of 10 patients with diabetes mellitus in whom the administration of from 50 to 100 mg. of 1-butyl-3-p-tolylsulfonylurea (Orinase) per kilogram of body weight given orally had not produced a significant reduction of the blood sugar level, venous blood samples were taken before and at half-hour intervals after the intravenous injection of 0.1 unit of insulin per kilogram of body weight. At the end of the second hour, each patient was given 50 to 100 mg. of tolbutamide per kilogram of body weight as a 2% solution in 0.5% sodium bicarbonate adjusted to pH 8. Blood samples were taken at 1 and 2 hours after the administration of the tolbutamide. The insulin-tolerance test was then repeated. Ten additional patients with diabetes mellitus served as controls in that they were given the sodium bicarbonate solution alone instead of that containing tolbutamide.

Essentially identical hypoglycemic responses occurred after each injection of insulin in the patients given sodium bicarbonate between the injections. Thus, there was no statistically significant difference in the percentile decrease in the blood sugar level at each interval after the first and second injections of insulin. Although tolbutamide did not induce a decrease in the concentration of blood sugar, its administration resulted in a more marked response to the same quantity of insulin. The difference between the values obtained at all intervals after the second injection of the insulin was statistically significant. The increased hypoglycemic response to the administration of exogenous insulin in patients with diabetes mellitus who manifested no response to that of the sulfonylurea alone is attributed to an inhibition of insulinase and a consequent decrease in the rate of insulin destruction.

SURGERY

Experiences with Radioisotopes in Stereotactic Operations on the Hypophysis. T. Riechert and F. Mundinger. Chirurg 28:145-151 (April) 1957 (In German) [Berlin].

The authors show that, with the aid of the stereotactic operative procedure, which was first used in human beings by Spiegel and Wycis in 1947, it is possible to reach deep intracranial structures by puncture without damaging the more externally located layers of the brain. For the operations on the hypophysis described the authors used their aiming or target apparatus, which was described earlier. In order to permit introduction of the target needle, a basic ring that will not shift is fastened to the head of the patient. A semicircular, rotatable target handle with an adjustable needle holder is attached to this ring. The puncture is made either through a small trephine opening in the cranial vault (transfrontal) or, after the downward-folding of the target handle, from the facial direction (transethmoidally). In extremely debilitated patients, the stereotactic operation can be performed in 2 stages, the trephine hole for the transfrontal approach being made at the first operation. The 248 stereotactic operations carried out by the authors included 79 on the hypophysis of 62 patients.

They describe the introduction of the target needle into the hypophysis under roentgenologic control and the subsequent introduction of high frequency current or radioactive isotopes. The patient must be fully conscious during these manipulations, so that he can give information about his vision and visual fields. Exclusion of the hypophysis by stereotactic application of radioactive isotopes or high frequency current was performed in 47 of the 62 patients for removal of tumors of the hypophysis, in 6 for tumors of the hypophyseal (craniopharyngeal) duct, in 4 patients for malignant hypertension, and in 5 patients for sex-hormone–dependent carcinomas. The isotopes used were radioactive phosphorus, P^{32}, and radioactive gold, Au^{198}. No fatalities resulted from the stereotactic operations on the hypophysis, and the therapeutic results corresponded to those obtained with open operations on the hypophysis. In retrospect it appears to the authors that a primary open operation might be advantageous. If the open operation should disclose a large tumor and the patient's general condition is poor, the operation could be restricted to the incision of the capsule and partial removal of the tumor to be followed by stereotactic application of radioactive isotopes after the surgical wound has healed.

Cancer of the Tongue: A Study Based on 653 Patients. S. Cade and E. S. Lee. Brit. J. Surg. 44:433-446 (March) 1957 [Bristol, England].

During the 30 years that have elapsed since Cade and Evans gave a preliminary report on treatment of cancer of the tongue with radium, Cade and associates have made observations on 653 patients. Whereas in 1925 there were 10 men to 1 woman among the patients with cancer of the tongue, this ratio has gradually fallen to 2:1. They differentiate between "small" and "large" rather than early and late lesions, since reliable statements about the length of the history were rare. The lymph nodes had become involved in 57% of the patients when first seen, and in about half of the remaining 43% the lymph nodes became involved later. Histologically, all but 8 of the tumors were squamous cell carcinoma. In Britain today the commonest ulcer of the tongue is cancer, although trauma, gumma, tuberculosis, infection around a foreign body, and actinomycosis may occasionally cause confusion. Biopsy should always be done. The authors observed no harmful effects from it, provided adequate treatment followed promptly.

In interstitial radium therapy, the implantation was carried out under general anesthesia, with an endotracheal tube and a throat pack. The position of the standard radium needles is checked by roentgenograms; this is necessary for the calculation of the dose.

With a dose rate of from 40 to 50 r per hour, a total dose of 7,000 to 8,000 r can be given in 7 days. The authors carried out 573 tongue implants in 507 patients. Conventional roentgen therapy with 200 or 400 kv. has proved disappointing, and these rays should be used only in the form of 2 million volts. The authors used teleradium units whenever external irradiation seemed indicated, and recently they used radioactive cobalt. They believe that radical surgery is rarely necessary, primary radium resistance or post-irradiation recurrences being about the only indications for radical operations.

Surgical therapy is preferable to radium therapy, however, for the treatment of cervical lymph nodes. A total of 461 of the 518 patients treated up to the end of 1950 could be traced; 124 of these survived for at least 5 years. The authors conclude that interstitial radium therapy permits the delivery of an adequate dose of radiation within a week. The postradiation effects are moderate and subside in about 3 to 4 weeks. Scarring is minimal, and the functional result is good. Primarily radioresistant lesions can be recognized early and operated on without delay. Teletherapy is the method of choice in lesions of the posterior part of the tongue, in large tumors, and in cases deemed unsuitable for needling. Palliative and radical surgery are reserved for selected cases. The treatment of choice for cervical lymph nodes remains radical or block dissection of the neck under certain well-defined conditions. Taking into account the great palliative value, the authors believe that radium therapy remains the method of choice in the great majority of patients.

Bridging of Laryngopharyngeal and Upper Cervical Esophageal Defects: Use of Artificial Materials. H. M. Morfit, C. T. Klopp and A. J. Neerken. A. M. A. Arch. Surg. 74:667-674 (May) 1957 [Chicago].

Of 51 patients with cancers arising in the laryngopharynx, extrinsic larynx, and upper part of the esophagus who were subjected to laryngopharyngectomy, partial esophagectomy, and neck dissection and in whom restoration of the pharyngoesophageal continuity was accomplished after complete removal of the tumor, primary closure was performed in 40 and prosthetic closures were required in 11. In the latter continuity was established with a cylindrical molded tube of polyethylene with a lumen about 1.5 cm. in diameter and walls about 4 mm. thick. The polyethylene tube was inserted inside the ends of the pharynx and cervical esophagus and sutured with interrupted mattress sutures. Strap muscles or occasionally prevertebral muscles were tacked down to support this "anastomosis" insofar as possible. There was 1 operative death due to hemorrhage from a large pharyngeal vein. In the remaining 10 patients, the immediate results appeared satisfactory. Although the tubes were eventually dislodged in 8 patients, they remained in place long enough for a serviceable conduit to form that served as a suitable channel for the ingestion of food. Fistula formation occurred in 5 of the 10 patients but closed spontaneously in all but 1. Long-term follow-up, however, revealed recurrent cancer at the end of 3 years in 9 patients and at the end of the 4th year in the 10th patient. This discouraging long-term salvage rate contrasts sharply with that achieved in the 40 patients with primary closure. Fourteen of the 40 patients were alive and well after 3 years. The average duration of life postoperatively in the 26 patients with primary closure who were therapeutic failures was 9.8 months as compared to 10.5 months in the 10 patients with prosthetic closure.

When the growth is limited enough to be extirpated by combined neck dissection, total laryngectomy, and partial pharyngectomy and for a primary closure to be obtained, the end-results indicate that the effort is worth while. Extension of the surgical removal beyond the above limits by means of a prosthesis can be achieved and is practical from the point of view of operative mortality and morbidity, but the long-term follow-up indicates that, when the growth is so extensive that these auxiliary measures must be called on, little or no increase in the salvage rate can be expected.

Histopathological Aspects of 113 Auricular Biopsies Taken During Operations for Mitral Commissurotomy: A Consideration of Latent Forms of Rheumatic Heart Disease. S. Papadopol and H. Ioachim. Arch. mal. cœur 50:205-217 (March) 1957 (In French) [Paris].

Bits of tissue were obtained from the auricular appendage of the heart during operations for commissurotomy. Microscopic examination of these specimens in 30 cases revealed subendothelial granulomatous nodules (rheumatic nodes of Aschoff). As many as 8 of these nodules could be seen in a field, and they were associated with a rich infiltration of wandering cells of the lymphoid or histioid type into the endocardium and subendothelial tissue. This condition was interpreted as subacute rheumatic endocarditis. In 7 cases there was an infiltration with lymphocytes and polyblasts without the formation of Aschoff bodies; this condition was interpreted as subacute lymphocytic endocarditis. In 76 cases interpreted as chronic sclerogenic endocarditis, there appeared to have been a subsidence of the lymphocytic infiltration paralleled by a proliferation of the fibrocollagenous tissue. Groupings reminiscent of Aschoff bodies remained, but the picture was that of advanced sclerosis.

The myocardium showed corresponding changes; these were classified as subacute rheumatic myocarditis in 14 cases, subacute lymphocytic myocarditis in 6, and chronic sclerogenic myocarditis in 39. The pericardium generally showed a relative thickening but little else except in 3 cases. In 2 of these a subacute rheumatic endocarditis was accompanied by an appreciable thickening of the epicardium and a vascular neogenesis; in the third there was a thrombus in the lumen of the atrium and intense pericarditis. The auricular lumen was generally clear, but in 7 cases mural thrombi caused partial or total obstruction.

The data failed to show that tonsillectomy had exerted any curative or preventive effect on the rheumatic infection. Eleven patients developed the complication known as postcommissurotomy syndrome, but no relation was found between the incidence of this syndrome and the finding of Aschoff bodies at biopsy.

A Clinicopathologic Study of the Anatomic Changes in the Heart Resulting from Cardiac Massage. L. Adelson. Surg. Gynec. & Obst. 104:513-523 (May) 1957 [Chicago].

The frequency with which cardiac arrest (asystole and ventricular fibrillation) occurs has been recognized more accurately during the past decade. A voluminous literature has accumulated on the theoretical, experimental, electrocardiographic, functional, prophylactic, and clinical aspects of cardiac arrest and cardiac massage, but little attention has been devoted to the damage to the heart that may be sustained as a result of rhythmic intermittent manual compression. This report deals with 60 patients who died either during or after cardiac massage and who underwent autopsy. Massage was performed by persons with varying levels of medical training and experience (intern, resident, and extern). Group 1 consisted of 44 patients who did not survive the cardiac massage and group 2 of the 16 who did. A heart was considered to have sustained no damage from manual manipulation if the only abnormalities noted at autopsy consisted of a few subepicardial or subendocardial petechiae. While such small hemorrhages may have been traumatic in origin, they are indistinguishable from those found in persons who died of shock or anoxia. The heart was considered to have sustained slight damage if it presented multiple subepicardial or subendocardial petechiae or zones of hemorrhagic extravasation. Small areas of intramyocardial hemorrhage were a frequent accompaniment. Moderate damage was diagnosed in the presence of extensive subepicardial or subendocardial hemorrhagic extravasation accompanied by prominent intramyocardial hemorrhage. Damage was considered severe when gross laceration of the heart or a major structure was present. In all such cases, the subepicardial, subendocardial, and intramyocardial hemorrhagic extravasation was striking. None of the 6 patients whose hearts showed severe injury survived the massage. Five of these presented gross myocardial laceration, and 1 showed laceration of a major coronary vein. Of the hearts of the remaining 38 patients who did not survive cardiac massage, 12 showed moderate, 7 slight, and 9 no damage.

Twenty-six of the 44 hearts in group 1 were in asystole when first examined. The remainder included 5 with ventricular fibrillation, 2 with idioventricular rhythm, 1 with a feeble beat, and 1 with a weakly co-ordinated beat. No data were available in 9. Thirty-three patients failed to respond to massage with any evidence of spontaneous cardiac activity. The others demonstrated occasional spontaneous beats, intermittent ineffective beats, ineffectual vermiform auricular or ventricular twitches, and ventricular fibrillation, that did not respond to defibrillatory measures. No instances of effective circulatory response were noted in this group. In the 16 patients in group 2, asystole was noted in 13 patients. One heart was in ventricular fibrillation, and no data were available in 2. Two of the hearts in asystole were converted to fibrillation and successfully defibrillated. Regular sinus rhythm ultimately developed in all 16 patients. Seventeen patients in group 1 and 7 in group 2 were treated only by massage. The others in both groups were subjected to a variety of therapeutic agents and procedures either singly or in combination. Nevertheless, prolonged massage (more than 1 hour) can be carried out without producing significant cardiac damage. The most frequent lethal sequel to cardiac arrest is anoxic damage to the central nervous system. Constant vigilance and prompt intervention are the only valid prophylactic measures. The cardiac injuries produced by massage are a result of the technique rather than of its duration. Instruction in the theoretical and practical aspects of cardiac massage are prerequisites for successful cardiac resuscitation.

Late Results of Gastrectomy for Cancer with Particular Reference to the Disturbances of the Gastric Condition and to Their Therapy. B. Binda and L. Ramoino. Minerva chir. 12:121-126 (Feb. 15) 1957 (In Italian) [Turin, Italy].

A total gastrectomy was performed in 14 patients with cancer of the stomach, followed by esophagojejunostomy and Braun's anastomosis. Twelve patients survived the operation; 3 of them died within the first year and 5 within 2 to 4 years after the total gastrectomy was performed. Six patients are still alive and in the 4th and 5th year, respectively, after their operation. Good results concerning the adjustment period were seen in 4 of the 9 patients, fair results in 3, and poor results in 2. The following disturbances were noted: dysphagia, esophagitis, epigastric pain, dumping syndrome, biliary regurgitation, steatorrhea, diarrhea, and meteorism. Inflammatory and ulcerative intestinal lesions were treated by adequate administration of preparations effective in the absence of gastric secretion. All patients with intestinal disorders, commonly occurring after a total gastrectomy, were given vitamin B complex. No significant metabolic disorders were observed except a more or less severe hypoproteinemia. No changes were seen in the vitamin and electrolytic metabolism. The administration of B_{12} and other agents that may contribute to hemopoiesis was important for the prevention of pernicious anemia. Anemia due to iron deficiency and megaloblastic anemia due to B_{12} deficiency were also prevented by adequate therapy. Good results could be obtained if postoperative treatment was continued methodically. The authors recommend total gastrectomy only in cases of absolute necessity.

Cholecystitis Glandularis Proliferans. L. P. Le Quesne and I. Ranger. Brit. J. Surg. 44:447-458 (March) 1957 [Bristol, England].

The development of epithelial sinuses or diverticula penetrating into, or even beyond, the muscle coat is a common change in chronic cholecystitis. These diverticula are often referred to as Rokitansky-Aschoff sinuses. Unfortunately, Aschoff referred to these same structures as "Luschka ducts," confusing them with the minute, aberrant bile-ducts described by Luschka. There are 2 distinct structures: 1. Luschka's ducts, which are duct-like structures found occasionally in the periphery of the gallbladder wall and occurring

most frequently on the hepatic surface of the viscus and usually along the edges of the fossa vesicae felleae. They have a wall of their own with the histological structure of the intrahepatic bile ducts. 2. Rokitansky-Aschoff sinuses, which are deeper out-pouchings or sinuses of the gallbladder mucosa that dip down into the muscularis or extend as finger-like processes through the muscular coat into the perimuscular layer. A bewildering variety of names has been applied to this lesion, but studies have demonstrated that the essential lesion is an excessive formation of epithelial sinuses (Rokitansky-Aschoff sinuses), many of them penetrating the muscularis, with associated chronic inflammatory changes and muscular hypertrophy. Consequently, it has been suggested that the condition should be known as cholecystitis glandularis proliferans, a term that has gained acceptance, although in radiological journals the condition is often referred to as diverticulosis of the gallbladder.

The authors recently observed 12 cases of cholecystitis glandularis proliferans. In 4 the lesion was found incidentally at autopsy; the remaining 8 patients were observed in clinical practice, and in these the lesions were apparent on cholecystography. In each patient the condition gave rise to a macroscopic, localized lesion in the gallbladder, the remainder of the viscus being normal. The authors emphasize that cholecystitis glandularis proliferans is not just a variant of ordinary chronic cholecystitis, but that, in fact, it constitutes a specific disease entity, and that the essential feature of the condition is a localized area of penetrating epithelial sinus formation with muscular hypertrophy. In view of the nature and distribution of the lesions, it is suggested that the condition results from some disturbance in the normal contraction of the gallbladder.

Perforated Appendicitis: 391 Cases Without Mortality. R. M. Bolman II, R. P. Lloyd and R. R. Johnson. A. M. A. Arch. Surg. **74**:719-732 (May) 1957 [Chicago].

Of 391 patients with perforated appendicitis, 217 male and 174 female, between the ages of 14 months and 89 years, who were operated on in the course of 11 years, none died. Of 104 patients with perforated appendicitis who were operated on in another hospital in the same community during the same period, 8 died. The authors' mode of preparation, operative technique, and postoperative care were as follows: The minimum time between admission and operation was 2 hours and the maximum 21 hours. When preparation was necessary, a Levin tube was installed and suction was started immediately, and the patient kept this through the operation and postoperatively until normal peristalsis was established. During the period of preparation 600,000 units of penicillin and 0.5 Gm. of streptomycin were given intramuscularly every 8 hours. If the urinary output of the patient whose condition was critical was nearly adequate during his first intravenous infusion, 2.5 Gm. of sulfadiazine sodium was given during the second infusion. This was the dose for an adult weighing 150 lb. (68 kg.), and the dose was adjusted for children and elderly adults. If the urinary output continued to be satisfactory after operation, another 2.5 Gm. of sulfadiazine was given in the first 24 hours postoperatively. More than this was never given. The administration of penicillin and streptomycin was continued postoperatively for 5 to 7 days and was supplemented when necessary with whatever antibiotic was recommended by the sensitivity test run routinely on the exudate obtained at operation. During the preoperative period any associated disease must be evaluated, its importance estimated, and a concerted attempt toward control instituted. Inhalation anesthesia with thiopental (Pentothal) sodium, cyclopropane, nitrous oxide, and ether through an endotracheal tube is the method of choice.

A far lateral McBurney incision was used exclusively. The suction was so placed as to receive the exudate before the opening of the peritoneum. Double ligation of the uncrushed appendiceal base was carried out. When the proximal portion of the appendix was not involved in the inflammation, the stump was not inverted. The stump was treated with mercocresols rather than any caustic agent. When the basal portion of the appendix was inflamed and friable, a Moynihan Z-stitch was used for inversion. A free omental graft was applied over a friable cecum and stump. The constant use of the suction tip minimized contamination and helped maintain gentle exposure. A gentle exploring finger was introduced into the pelvis. The loops of intestine in the immediate vicinity were inspected carefully and gently. If exudate was found, it was gently aspirated. At this point 1 to 2 qt. (1,000 cc.) of sodium chloride solution at body temperature was poured slowly into the incision and allowed to gravitate to the pelvis, from which point aspiration is easy. The last 220 patients had no medication placed in the abdomen. If there was a severe spreading peritonitis, the patient was given 1,000,000 units of aqueous penicillin and 1 Gm. of aqueous streptomycin intramuscularly on the operating table. Closure of the peritoneum was accomplished with fine continuous absorbable surgical suture. The abdominal wall was scrubbed with soap and water after tight closure of the peritoneum. No intra-abdominal drains were used in the last 226 patients, and the authors found no indication for this type of drainage. The early and prolonged use of the indwelling stomach tube and suction is stressed. The aim, when possible, is to prevent rather than treat distention.

It is believed that complete application and strict adherence to this plan of treatment, with the same vigor as is used in upper abdominal or vascular operations, should reduce the mortality from perforated appendicitis to a minimum.

Ochronosis. G. K. Rose. Brit. J. Surg. **44**:481-482 (March) 1957 [Bristol, England].

Rose presents the history of a 57-year-old woman, who complained of pain in both hips. She was older in appearance than her years. She walked with an extremely poor gait, with her hips in a flexed position and leaning forward on to a stick. All movements of her spine were grossly limited, and she stood with a marked pelvic tilt. The right hip was ankylosed in a position of flexion and adduction. She also had gross

osteoarthritic changes in the knees. When the patient was hospitalized, it was noted that her urine reduced Benedict's solution, but it was recognized that this was a false reduction from the point of view of sugar although the true significance was not appreciated. When operation was undertaken it was noted that in the long head of the rectus femoris there was a small black tumor, which was found to be composed of coal-black material. When the hip joint was exposed it was found that the inferior half of the cartilage had a similar appearance to the small swelling. At this stage the significance of the urine tests became apparent and a diagnosis of alkaptonuria with ochronosis was made.

The condition is usually recognized in childhood and frequently by the black staining of napkins. Later in life it may be discovered during routine examination of the urine. The condition is compatible with long life, and there are no clinical manifestations other than the discoloration of the urine until the second or third decade when ochronosis tends to appear. The color of the freshly voided urine is not unusual, if it is acid, but, if it is alkaline, it appears as some variant of brown or even black. When the appearance of the urine is normal, it reduces Benedict's solution, giving rise to a yellow or orange precipitate and a brown or black supernatant fluid. When ferric chloride is added drop by drop an evanescent blue color appears, and, when a strong alkali is added and the specimen shaken, it promptly turns dark. All of the above reactions are presumptive evidence of alkaptonuria, but isolation of homogentisic acid is the only certain proof.

Signs that may be associated with ochronosis include patches of light brown or slate-grey pigment in the scleras on either side of the corneal limbus, and bluish discoloration of the external ear, the nasal cartilages, and superficial muscle tendons of the hands. Brown pigmentation may be seen in the skin, particularly that of the face, axillary folds, thenar and hypothenar eminences, and the nails. The perspiration may be black or brown and the cerumen similarly deepened in color. On X-ray examination the presence of thinned, densely calcified, intervertebral disks is characteristic. In addition, degenerative osteoarthritic changes are apparent in the spine, lumbosacral, sacroiliac, shoulder, hip, and knee joints, and calcifying deposits may be seen in tendons about the large joints. The woman had few of the signs of alkaptonuria. She had faint blueness of the cartilage of the ears and black spots on the conjunctivas. Roentgenologic examination, however, showed the characteristic changes.

Carcinoma of the Uterine Tube: A Review and a Description of a Case with Unusual Clinical Features, Presenting as an Acute Abdominal Emergency. W. F. W. Southwood. Brit. J. Surg. 44:487-489 (March) 1957 [Bristol, England].

A preoperative diagnosis of carcinoma of the uterine tube is seldom made. Of over 500 cases reported in the literature, a preoperative diagnosis has been claimed in less than 10. In women who present with a blood-stained vaginal discharge and in whom uterine curettage is negative, carcinoma of the uterine tube should be considered in the differential diagnosis. Hydrops tubae profluens is significant but rare. Falk in 1898 recommended cul-de-sac puncture in order to withdraw the contents of a carcinomatous tube adherent to the pelvic peritoneum; this method enabled him to be the first to establish the diagnosis preoperatively. More recently salpingography has been suggested as a diagnostic procedure, but this is probably almost as dangerous. The Papanicolaou technique of smear diagnosis will probably result in the preoperative diagnosis being made more frequently in future. The 52-year-old woman, whose history is presented, was hospitalized as an emergency case with a provisional diagnosis of acute appendicitis. The abdomen was explored through a right lower paramedian incision. Free fluid was present in the peritoneal cavity. The appendix was found to be normal, but a large swelling of the right uterine tube was present. Right salpingectomy was performed. On opening the tube, evidence of recent hemorrhage was found. Microscopical examination of an irregular mass at the ampullary end of the tube revealed a poorly differentiated adenocarcinoma of high-grade malignancy. Convalescence was uneventful. In view of the anaplastic nature of the tumor it was thought that radiotherapy would be of greater benefit than a more extensive operation. The whole pelvis was irradiated with a homogeneous dose of 4,000 r, using 4 portals. At the last examination, 2½ years after the operation, no evidence of recurrence was found. Many other reports comment on the poor prognosis of this disease.

Experiences with a New Method of Selective Abdominal Arteriography. F. Morino, A. Tarquini and C. Quaglia. Chirurg 28:152-155 (April) 1957 (In German) [Berlin].

Realizing the importance of a clear selective visualization of the arterial circulation in the most important abdominal organs, the authors describe a technique for the selective contrast photography of the arteries branching off from the abdominal aorta. The technique begins with catheterization of the brachial artery. Under local anesthesia, this artery is exposed in the left arm, and, after removing the tunica adventitia for a distance of several centimeters, a small incision is made into the artery between 2 hemostatic ligatures. Then a catheter with a curved tip is introduced. Under roentgenologic control, it is advanced in the lumen of the brachial artery to the subclavian artery, up to the aortic arch, and along the abdominal aorta beyond the diaphragmatic hiatus.

Then if the catheter is advanced slowly in the caudal direction, the tip reaches the ostium of the celiac artery at about the level of the 12th thoracic vertebra. When the catheter enters the celiac ostium, there may be a feeling of a sudden resistance, and, roentgenologically, a sudden bending of the catheter tip is seen as it turns in the cranial direction. As the catheter, the tip of which should always be directed to the anterior wall of the aorta, advances caudally beyond the trunk of the celiac artery, a new resistance is felt

at the ostium of the superior mesenteric artery, which normally is located at the level of the first lumbar vertebral interspace. More distally, the tip of the laterally directed instrument reaches one of the renal arteries, which because of their width, location, and direction are the easiest to catheterize of all the collateral branches. If the ventrally directed catheter is further advanced, the inferior mesenteric artery is reached at the level between the second and third lumbar vertebra. The catheterization of this vessel is difficult, because it has about the same caliber as does the catheter; the same is true of the lumbar, the lower diaphragmatic, the adrenal, and the genital arteries.

Throughout the entire procedure the catheter is irrigated with sterile physiological solution of heparin, and, after it has been determined that the catheter will enter the desired artery, a few cubic centimeters of a 1% solution of procaine hydrochloride is added for spasmolytic purposes. A few minutes later, from 4 to 8 cc. of a contrast medium is injected within 2 seconds. Roentgenography is begun during the injection of the opaque substance. Serial roentgenograms are made if functional data are desired. The authors emphasize the advantages of this method, particularly as regards diagnostic possibilities, over the former aortographic methods. No serious side-effects were observed; there were no persisting arterial spasms or thromboses due to endothelial injuries of the vascular wall.

NEUROLOGY & PSYCHIATRY

Intracranial Aneurysms, Congenital and Acquired: Diagnosis, Treatment and Prognosis. E. N. Weaver. J. Internat. Coll. Surgeons 27:576-589 (May) 1957 [Chicago].

The author reports on 10 patients with intracranial aneurysms, 5 men and 3 women between the ages of 39 and 65 and a 14-year-old boy and a 14-year-old girl. Three of the adult patients had infraclinoid aneurysms of the internal carotid artery occurring in the cavernous sinus, 1 woman had a large ruptured aneurysm of the supraclinoid internal carotid artery, and 1 woman and the boy had aneurysms of the anterior part of the circle of Willis. One man had an aneurysm occurring in the peripheral part of the left cerebral artery with sudden rupture producing a hematoma in the left temporal lobe, 1 man had a bleeding aneurysm of the left anterior cerebral artery that produced a hematoma of the left frontal lobe, extending into the ventricle, and 1 man and the girl had arteriovenous aneurysms.

Aneurysms of the internal carotid artery below the clinoid, both unruptured and ruptured, can be adequately treated by cervical ligation alone or combined with intracranial clipping, thereby trapping the aneurysm. The first patient with this type of aneurysm was treated and cured by ligation of the internal carotid artery. The second patient had palsy of the third cranial nerve with pain in the forehead; ligation of the common carotid artery induced temporary relief of pain for 1 week, and clipping of the internal carotid artery resulted in complete relief of pain and palsy. The third patient was relieved of her pain by ligation of the common carotid artery, but palsy of the abducens nerve persisted. The patient with a large ruptured aneurysm of the supraclinoid internal carotid artery was treated successfully by the trapping method. Aneurysms of the circle of Willis, with rupture, are associated with a mortality of 50% or more. The incidence of recurrence may vary from 50% to 80%. The mortality rate from direct operative attack on the aneurysm is not higher than 20% and definitely lower than the mortality rate among patients who are left untreated. Of the 2 patients with this type of aneurysm, 1 in whom the aneurysm ruptured during dissection, with profuse bleeding, died on the first postoperative day. In the second patient, the wall of the aneurysm was extremely thin, but it was possible to apply a clip to the neck of the aneurysm and small strips of hammered muscle were wrapped around the aneurysm to reinforce it. The postoperative course was uneventful, and the patient was asymptomatic 6 months after the operation.

The hematomas were evacuated and the aneurysms removed with good results in the 2 patients with aneurysms of the peripheral portions of the major cerebral vessels. Aneurysms of this type are usually not diagnosed before rupture, at which time they produce a subarachnoid hemorrhage and frequently an intracerebral clot. The treatment of choice is direct attack on the aneurysm, evacuation of the clot, and clipping of the neck of the aneurysm. Cervical ligation is probably of no significant benefit in the treatment of peripheral aneurysms. Of the 2 patients with arteriovenous malformations, 1 had a small berry aneurysm over the frontal lobe that was clipped and satisfactorily removed by surgical means. The other patient who had an extensive arteriovenous lesion on the left side and whose only symptoms were convulsive seizures was treated conservatively. Smaller lesions can be satisfactorily removed surgically, but in many cases the larger lesions are impossible to remove without causing significant increases in the chances of mortality and morbidity. Better angiographic technique with a 50% solution of diatrizoate (Hypaque) sodium, used as contrast medium, aided in the diagnosis of the intracranial aneurysmal lesions. In about 30 cases of the injection of this contrast medium, some blanching of the face on the side that received the injection was the only complication observed.

Postmeningitic Subdural Effusions. J. M. Williams and H. Stevens. J. Internat. Coll. Surgeons 27:590-594 (May) 1957 [Chicago].

The occurrence of subdural effusions, containing protein in amounts varying from 15 to 2,000 mg. per 100 cc., with cell counts of a few to several hundred, usually lymphocytes and crenated red cells, has been reported after bacterial meningitis in 30 to 60% of children with this disease treated at several large pediatric institutions. These effusions may result in a "survival syndrome" in a bacteriologically cured but neurologically damaged child. The presence of subdural effusions is easily recognized by performing

bilateral subdural taps through the open fontanel in any child whose clinical response to antibiotic therapy is unsatisfactory. Observations in 3 infants, 1 with bacterial meningitis, 1 with viral meningitis, and 1 with a lumbar meningocele, in whom subdural effusions occurred after the repeated withdrawals of 10 to 15 cc. of spinal fluid, suggested that such effusions in children may be inadvertently induced by excessive withdrawal of fluid at the time of the diagnostic spinal tap. Consequently, the diagnostic spinal punctures were limited to one tap and to a maximum withdrawal of 3 cc. of spinal fluid in 27 children with bacterial meningitis admitted to hospital in the course of 8 months. During this time only 3 cases of subdural effusions were observed, and the incidence of the subdural effusion as a complication after bacterial meningitis thus was decidedly reduced.

Guillain-Barré Syndrome Treated with ACTH. A. Lønnum. Tidsskr. norske lægefor. **77**:256-257 (March 15) 1957 (In Norwegian) [Oslo].

In the neurological department of the Rikshospital, 2 patients with radiculoneuritis characterized by a rapidly progressive course and respiratory distress were treated with corticotropin. Progression of the disease ceased immediately on the start of treatment, and in the course of a few days there was relatively rapid improvement. The improvement continued, but slowly. It is suggested that corticotropin may influence some pathogenetic factor, for example edema.

Stellate Ganglion Block in the Treatment of Cerebral Vascular Accidents. D. David and E. Garda. Minerva med. **48**:665-668 (Feb. 28) 1957 (In Italian) [Turin, Italy].

Blockage of the stellate ganglion by injections of pantocaine, novocaine, or xylocaine was carried out in 22 patients with various types of cerebral vascular disease. The diagnoses were acute thrombosis (7 cases), chronic thrombosis (4), acute embolism (6), acute hemorrhage (2), chronic hemorrhage (2), and acute vascular spasm (1).

The technique was that of Amves and Perry (J. A. M. A. **142**:15-20 [Jan. 7] 1950), which the authors prefer as the one least likely to cause difficulties and complications. With the patient supine and a cushion under his shoulders so as to extend the neck, a needle is introduced in such a way that, at a depth of about 3 cm., its tip touches the transverse process of the 7th cervical vertebra; it is then retracted about half a centimeter, and aspiration is attempted to make sure that it is not in a vessel, in the pleural cavity, or in the vertebral canal. Epinephrine is not used in patients who are old, hypertensive, or have thyrotoxia. A successful block is manifested within 20 minutes by enophthalmos, miosis, and other signs of sympathetic paralysis on the injected side. The only mishaps, in 100 blocks done by the authors, have been punctures of blood vessels (3 instances) and paresis of the recurrent nerve (1 instance). Improvement or complete recovery followed in 5 out of 7 patients with acute thrombosis, in 3 out of 6 patients with acute embolism, and in 2 out of 4 patients with chronic thrombosis. Two of the patients with acute thrombosis, 2 with acute embolism, and 2 with acute hemorrhage were made worse. The patient with vascular spasm recovered quickly.

The authors believe that the beneficial results they obtained justify the regular use of stellate ganglion block in apoplexy and that the operation is most effective if done early in patients who have been hospitalized promptly after the onset of symptoms.

Meningoencephalitis Due to Listeria Monocytogenes. T. Kahrs and O. Weisert. Tidsskr. norske lægefor. **77**:252-254 (March 15) 1957 (In Norwegian) [Oslo].

Listeriosis, caused by Listeria monocytogenes, is less frequent in man than in animals. The first case in domestic animals was reported in 1931 in New Zealand by Gill, who described an encephalitis-like disease in sheep, which he called "circling disease." The first case of Listeria meningitis in man was described by Dumont and Cotoni in 1921, and the identification of the causative agent was later verified by Paterson. Two cases have already been reported in Norway, both with a fulminant course and death in 5 to 7 days. The case of grave meningoencephalitis due to L. monocytogenes here described occurred in September, 1956, in a truck driver, aged 30, who in the summer had hauled sheep from a district where listeriosis had become established in 3 or 4 flocks, with 12 deaths due to meningoencephalitis having occurred. In the vernacular the disease was termed "kring-gaa," which corresponds to Gill's "circling disease." Possible transmission from animals to man is suggested in this case. Complete recovery followed in 6 weeks under combined antibiotic treatment and chemotherapy.

GYNECOLOGY & OBSTETRICS

Vitamin B_{12} and Pregnancy. M. Dumont. Presse méd. **65**:601-602 (March 30) 1957 (In French) [Paris].

Vitamin B_{12} can be assayed by biological methods that are difficult and costly and by the more widely employed microbiologic tests. Lactobacillus organisms are used for the microbiologic assay. After reviewing vitamin B_{12} assays on gravid animals, the author describes studies on women during pregnancy, delivery, and lactation, on normal and prematurely born infants, and on women with anemias that occurred during pregnancy. Vitamin B_{12} deficiency in animals causes disturbances in the reproductive function, such as death of the fetuses, hemorrhagic or degenerative lesions, and malformations. Vitamin B_{12} deficiency in pregnant women generally becomes manifest in the 5th or 6th month of pregnancy. The assay of vitamin B_{12} in the normal newborn infant is generally higher than that in the mother, except when the mother has had a definite vitamin B_{12} deficiency during pregnancy. The placenta is low in vitamin B_{12} content and plays an active role in the transfer of the vitamin only at the end of pregnancy. The prematurely born infant

often shows a deficiency of vitamin B_{12}, but the administration of this vitamin produces contradictory results in these infants.

Maternal hypovitaminosis is the rule during lactation. The vitamin B_{12} content is elevated in the colostrum and in the milk in the first several weeks of lactation, and, then, it decreases, but it can be increased by the oral administration of the vitamin to the mother, particularly in combination with cobalt. Intramuscular injection of vitamin B_{12} in the mother will effect a more prolonged vitamin increase in the milk. Certain forms of megaloblastic anemias in pregnant women can be successfully treated by giving vitamin B_{12}, but treatment with folic acid is sometimes more effective. The author recommends the routine administration of vitamin B_{12} to pregnant women, particularly during the last trimester of pregnancy, and to premature infants. The standard prophylaxis and treatment of the anemias of pregnancy in France consist of the administration of iron, folic acid, and vitamin B_{12}.

PEDIATRICS

The Offspring of Alcoholic Parents. G. Heuyer, R. Misès and J.-F. Dereux. Presse méd. **65**:657-658 (April 10) 1957 (In French) [Paris].

In discussing the influence of alcoholism in the parents on the occurrence of physical and mental defects in their offspring, the authors review the literature on this problem and report their own findings on 100 children, the offspring of parents who were addicted to alcohol. These patients were seen in consultation at the neuropsychiatric department of the children's clinic of the Salpètrière. The 100 children included 10 with essential epilepsy, 30 with psychomotor disturbances, and 60 with behavior problems. Of this last group, about 20 had psychomotor instability, whereas, in the other 40, the troubles appeared to be related to affective difficulties, in the form of either existing conflicts or sequels of earlier disturbances.

After discussing the theories that have been advanced with regard to the heredity of alcoholism and the present concepts on this problem, the authors conclude that the concept of hereditary alcoholism, allied with the theory of degeneracy should be rejected. Although children born of parents addicted to alcohol show a rather high incidence of psychopathic manifestations, genetic factors were thought to be of much less importance than are defective training and social, economic, and familial disturbances.

INDUSTRIAL MEDICINE

An Outbreak of Trio-ortho-cresyl Phosphate (T. O. C. P.) Poisoning in Durban. M. Susser and Z. Stein. Brit. J. Indust. Med. **14**:111-120 (April) 1957 [London].

Triorthocresyl phosphate (T. O. C. P.) is an organic phosphorus compound, commonly used in industry as a plasticizer. In the United States a poisoning with the compound occurred in 10,000 to 15,000 people during prohibition. Several hundred women in Europe were poisoned by the compound in 1931 by an apiol pill, taken as an abortifacient. An outbreak of poisoning with triorthocresyl phosphate that occurred in Durban, South Africa, in 1955, involved 11 natives, ranging from 7 to 46 years of age. In addition to these, 4 other patients in a white family, who had been poisoned in Durban in 1937-1938, could be reexamined. The clinical findings, including a delayed flaccid paralysis with subsequent upper motor neuron signs, was a reliable guide to diagnosis. Swelling of the parotid glands was reported for the first time in 1955. The 1-month-old baby, living in the same shack as the patients, as well as the 14-month-old baby of the white family were not affected. This suggests that infants resist demyelination, perhaps because the long tracts of the spinal cord are not completely myelinated. According to some clinicians, the severity of the lesions is not proportional to the dose, as the individual susceptibility varies. From the epidemiologic study of the outbreak in 1955, it is suggested that water as well as lipids and alcohol may be a vehicle for the poison, either in solution or in suspension or both.

The outbreak of 1955 is the first to be reported in relation to the industrial use of the compound as a plasticizer; the necessity for precaution in industry is emphasized. Family, social, and occupational factors are important in diagnosis. A follow-up after 18 years on 4 patients who had poisoning due to the compound showed that disability may be permanent. No known treatment has any specific effect, and the measures are limited to necessary physical and moral support.

RADIOLOGY

A Clinical Study of Radiation Cataracts and the Relationship to Dose. G. R. Merriam Jr. and E. F. Focht. Am. J. Roentgenol. **77**:759-785 (May) 1957 [Springfield, Ill.].

Radiation cataracts developed in 100 of 173 patients, 89 male and 84 female, between the ages of 4 weeks and 84 years, who had been irradiated for hemangiomas of the lids, orbit, cheek, and mouth and for various types of carcinoma of the lids, eye, nose, nasopharynx, sinuses, cheeks, palate, and gum. The amount of radiation to the lens was measured with the aid of a specially devised phantom skull. The patients were divided in 3 groups; the first included patients who had received their irradiation in a single treatment, the second was comprised of patients who were given divided treatment over a period of 3 weeks to 3 months, and the third group included those who were given divided treatment for periods of more than 3 months. The minimum cataractogenic dose for each group was 200 r, 400 r, and 550 r respectively.

The incidence of cataracts in the group of patients treated for 3 weeks to 3 months suggested that if a dose of 750 to 950 r were delivered to a lens within such a period there would be about a 60% probability that a cataract would develop and about a 50% chance that it would be progressive with a corresponding loss of vision. Cataracts developed in all patients who re-

ceived more than 1,150 r to the lens, irrespective of the duration of treatment. The 100% incidence level occurred at the lowest dose for the group of patients who received a single treatment. In the patients with multiple treatment, the longer the duration of treatment the lower was the incidence at a given dosage range below 1,150 r. When the effect of dose and varying treatment times on the time of onset and progression of cataracts was considered, it appeared that the higher the dose for a given duration of treatment, the shorter the time of appearance of the lens changes and the higher the incidence of progressive opacities. In general, fractionation delayed the time of onset of cataracts and resulted in fewer severe opacities. The lenses of children under 1 year of age appeared to be more sensitive to irradiation than those of older children and adults.

The usual shielding methods are ample protection for the lens from x-rays of 100 to 140 kv. (half-value layer 1 to 5 mm. Al). When higher voltages are used (200 to 250 kv. half-value layer 1 to 2 mm. cu), 2 mm. Pb will usually suffice for the tumor doses currently used. With the lower doses being used at present and with care in positioning the ports, radiation cataracts will be seen less frequently in patients with retinoblastoma. In these patients radiation cataracts are of necessity a calculated risk. It is estimated that by the use of current treatment techniques the lens opacities could have been prevented in at least 80 of the 100 patients.

Dangers in Ionizing Radiation and Possibility of Protection. A. J. Therkelsen. Ugesk. laeger **119**:323-328 (March 14) 1957 (In Danish) [Copenhagen].

Recent investigations point to the dangers in medical application of roentgen rays, partly the danger of the development of leukemia and cancer, partly the dangers of genetic kind. The conclusion is that there is no doubt as to the leukemogenic effect in man and that until further investigations have been carried out even the small doses applied in diagnostic radiation of mothers during pregnancy must be considered as increasing the danger of leukemia in the offspring. With regard to genetic side-effects the greatest risk at present arises from the constantly increasing application of roentgen rays for diagnostic purposes.

Radiation Sialitis Following Radioiodine Therapy. A. W. G. Goolden, J. R. Mallard and H. E. A. Farran. Brit. J. Radiol. **30**:210-212 (April) 1957 [London].

The authors present the histories of 2 patients in whom sialitis developed after radioactive iodine (I^{131}) had been given for the treatment of thyroid carcinoma. Sialitis was confined to the submandibular glands in one patient, while in the other both submandibular and parotid glands were involved. Attempts were made to estimate the radiation dose that may have been received by the salivary glands of these patients. In 1 patient a tracer dose of 100 μc of I^{131} was given intravenously 3 months after he had received the second therapeutic dose. Samples of blood and of freshly secreted mixed oral saliva were collected simultaneously during the 5 hours immediately after the administration of the tracer dose. The I^{131} content of the plasma and of the saliva were measured with a scintillation counter and the ratio of concentration of I^{131} in the saliva to that in the plasma was determined; in the other patient this was done after a third therapeutic dose. The authors found records of 2 other patients in whom sialitis resulted from the use of I^{131}, and they mention investigators who observed that salivary function as measured by the level of salivary amylase was temporarily suppressed after therapeutic doses of this isotope. Futhermore, patients undergoing treatment for malignant disease of the mouth with roentgen rays of teleradium therapy almost invariably suffer from dryness of the mouth if both parotid glands are irradiated at dosage levels of the order of 500 to 1000 r.

PUBLIC HEALTH

Effects of Air Re-circulation on Bacterial Pollution in Hospital Wards. D. M. Forsyth. Tr. Roy. Soc. Trop. Med. & Hyg. **51**:163-168 (March) 1957 [London].

In Kuwait, Arabia, maximum temperatures in the shade during summer of over 115 F are the rule and 120 F is often exceeded. The relative humidity is usually less than 10% at noon. Some form of cooling is desirable for the well-being of hospital patients, and the method adopted is that of continuously circulating a closed atmosphere over chilled water pipes. The air eventually becomes stale and malodorous, and, in order to counteract this by fresh air change, it is the custom for the night nurse to open up all the windows for about an hour during the coolest part of the early morning. As it was thought that the continuous recirculation of the same atmosphere would lead to an increase in its bacterial content, an investigation was carried out in fully occupied wards. Simple sedimentation techniques and later the slit sampler were used to determine the effects of bacterial pollution of recirculating a closed atmosphere. It appeared that simple "comfort cooling" or recirculation caused no increase in the number of organisms in the air, provided dust production was small, i. e., in normal or quiet conditions. When dust production inside a ward was maximal, e. g., during dusting and bed-making, the mechanical recirculation of the air produced an increase in the bacterial contamination of the atmosphere. Therefore, when the method of ward cooling is that of simply recirculating a closed atmosphere over chilled water pipes, bed-making and such activities should take place when all doors and windows in the ward are being kept open. This will also allow the escape of stale air laden with body odors. Alternatively, floors, blankets, and linen could be oiled and other measures taken, as recommended in the Medical Research Council War Memorandum No. 11. It is debatable if it is justifiable to install expensive and elaborate apparatus with air washers and filters in hospital wards when simple recirculation is cheap and safe.

BOOK REVIEWS

The Practice of Medicine. Editor: Jonathan Campbell Meakins, C.B.E., M.D., LL.D. Sixth edition. Cloth. $16. Pp. 1916, with 318 illustrations. C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1956.

The editor of this volume is a distinguished clinician and teacher. The task confronting him has grown enormously in the 20 years since he published his first edition of this work. The gains constantly being made in the basic medical sciences as well as in clinical medicine must represent a psychological barrier of no mean magnitude to an editor. The result is the fruition of monumental labor and of a love for the subject. This heavy book has many of the virtues and faults inherent in any compendium attempting to encompass the whole field of medicine, including neurology. The quality of clinical judgment, quantity of factual material, and the elegance of presentation vary from section to section. In some of the most rapidly expanding medical fields, the book is already partially outmoded. For instance, the excellent section on the chemotherapy of infection contains no bibliographical reference after 1953, except for an obviously erroneous reference on page 587 to an article published in 1959. The editor has wisely permitted his associate editors wide latitude in preparing their respective sections. One of the best sections is that on diseases due to viruses. All but 4 of the 25 chapters were written with great unity and clarity by one person. Happily, this clarity was well matched by the other three contributors.

On the other hand, the section on diseases of the heart and pericardium illustrates some of the perils of multiple authorship. It is somewhat unbalanced with overemphasis on instrumentation at the expense of clinical findings. Within these two categories there is a lack of a sense of the fitness of things with respect to the proper purposes of a text of this kind. The chapter on electrocardiography is too esoteric for undergraduate medical students. Although the author devotes several pages to the fundamentals of electrocardiography, he fails to give the reader any range of values for the normal electrocardiogram. The section on heart disease has a somewhat different organization than that of the rest of the book. It begins with a chapter on cardiac symptoms that includes a subsection on palpitation. In the latter, no mention is made of the fact that palpitation can be sudden or gradual in onset and cessation and that it is important for the student or practitioner to determine which type his patient has. He thus may be able to distinguish between a paroxysmal disturbance of the heart rhythm and sinus tachycardia. In the chapter on cardiac arrhythmia where paroxysmal sinus tachycardia is described, there appears to be unqualified acceptance of the psychoanalytic interpretation of the background for this rhythm. On page 928 this sentence occurs: "It is a panic over this fantasy (of homicide) which can precipitate in predisposed individuals attacks of paroxysmal sinus tachycardia with repression of the antecedent affect and fantasy." In discussing the therapy of cardiac disorders, the book errs in two important ways, one of commission and one of omission. It is suggested that digitalis dosage be based on the patient's body weight, a technique long since discarded. No mention is made of the extremely wide range from patient to patient of the digitalizing dosage or of the effective maintenance dosage requirement. The admittedly controversial question of long-term prophylactic anticoagulant therapy is not presented. Anticoagulants are not recommended in the treatment of pulmonary emboli occurring as a complication of congestive heart failure.

The sections on diseases of the ductless glands and of the gastrointestinal tract deserve special mention for clarity, sound judgment (including a provacative lack of dogmatism), and excellent illustrations. The final section on psychosomatic aspects of medicine exhibits rare common sense in this field. The index is more than adequate. This is especially important in a textbook of medicine. Physical make-up of the book is unusually good; only one typographical error, other than the one mentioned above, was found. This volume can be recommended, with only minor reservations, to medical students and practitioners.

Spinal Cord Compression: Mechanism of Paralysis and Treatment. By I. M. Tarlov, M.D., Professor of Neurology and Neurosurgery, New York Medical College, New York. Cloth. $7.50. Pp. 147, with 41 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

This monograph on spinal-cord compression is by a neurosurgeon who has done much experimental work on the subject. The first section is devoted to the description of studies in dogs in which spinal cord and cauda equina compression is produced by a balloon inserted into the extradural space. The effects of acute and gradual compression are described. The functional changes are correlated with histopathological changes in the spinal cord. The second section of the book discusses symptoms, therapy, and prognosis of spinal paralysis in man caused by trauma and by tumor. The third section is concerned with the early management of patients with acute transverse lesions of the cord as result of trauma. The material is presented in an orderly fashion. The format of the book is good. The illustrations are pertinent and clearly reproduced. The author's conclusion that compression of spinal vessels does not play a significant role in the pathogenesis of acute transverse lesions of the spinal cord that may develop in patients with tumors is open to question. The author concludes from his experi-

These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

ments in dogs that the cord injury is always the result of compression of the cord substances. He ignores the fact that acute transverse myelitis may develop in patients with metastatic carcinoma or lymphomatous tumors of the spine without any evidence of compression of the cord as determined by myelography, operation, or necropsy. The monograph should be of particular interest to neurologists and neurosurgeons. The detailed description of the early management of acute traumatic lesions of the spinal cord should be of great value to the general surgeon who may be responsible for the care of such patients.

Diabetes Mellitus With Emphasis on Children and Young Adults. By T. S. Danowski, B.A., M.D. Cloth. $13.50. Pp. 510, with illustrations. Williams & Wilkins Company, Mount Royal and Guilford Aves., Baltimore 2, 1957.

This is a unique book on diabetes mellitus. In contrast to the usual approach to the subject, the emphasis is on the biochemical and hormonal aspects of the disease. In the first of three sections the author gives a thorough, modern review of experimental diabetes and the interaction of the endocrine glands in glucose metabolism. References are complete and the brief summaries at the end of each chapter are valuable. The second section is a collection of more practical data. Drawing heavily on his own observations, the author considers the magnitude of the diabetic problem, particularly the juvenile form. He includes valuable sections on interpretation of the glucose tolerance curve, renal glycosuria, and the electrolyte changes accompanying insulin and glucose administration. Glucagon and epinephrine are briefly discussed. Therapy of diabetes is considered, with emphasis on the metabolic effects of insulin administration. The highlight of the final section, which is otherwise a loosely-connected collection of observations on diabetes mellitus, is the consideration of diabetic acidosis and its management. Lucid explanation of the electrolyte changes attests to the author's well-known proficiency in acid-base balance. Diabetes in older age groups and the vascular complications are given only token consideration. Practical aspects of routine diabetic care (patient education, insulin timing, and management through surgery) are briefly discussed but not stressed. In spite of these minor objections, this book is a valuable contribution. It should be particularly enjoyed by students of abnormal carbohydrate metabolism.

Basic Foundations of Isotope Technique for Technicians. Edited by Willard C. Smullen, M.D., F.A.C.R., Radiologist in Charge, St. Mary's Hospital, Decatur, Ill. Cloth. $4.75. Pp. 163, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1956.

As an introduction to isotope procedure for technicians, this book serves a definite purpose. The editor noted that "no attempt is made to explore the technical intricacies of our subject." Only the basic fundamentals of isotope techniques are described after introductory chapters on the physical foundations, measuring instruments, and protection. The material is presented simply, being aimed for the use of those who are beginners in the use of radioisotopes but who are acquainted with the more usual laboratory procedures. It is not intended for radiologists or others who have already been trained in or have worked with isotopes. Several bibliographies are included with the aim of tempting further study, once the groundwork is accomplished. As is usual with first editions, typographical errors appear. Misspellings of such words as Hürthle and desiccate should be easy to correct in subsequent printings. This book is recommended for technicians and beginners in radioisotope work.

Gifford's Textbook of Ophthalmology. By Francis Heed Adler, M.D., William F. Norris and George E. Deschweinitz, Professor of Ophthalmology, University of Pennsylvania Medical School, Philadelphia. Sixth edition. Cloth. $8. Pp. 499, with 303 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W.C.2, England, 1957.

This new edition is the third to appear under the auspices of Francis H. Adler. This textbook has become the principal contender with May's "Diseases of the Eye," now being edited by Charles A. Perera, for first honors in its field. This book is slightly larger than May's, which makes for somewhat more laborious reading by the hard-pressed undergraduate but possibly offers some slight advantage as a reference work for the nonophthalmologist and as an introductory treatise for the neophyte in ophthalmology. The present edition omits some extraneous material, condenses certain chapters, and adds a chapter on the emergency treatment of ocular injuries. While the latter has increased the size of the book by a few pages, it is a most valuable addition. The style of writing is smooth, concise, and readily understandable. The author has exercised thoughtful discrimination in the selection of his material and in the simplicity and accuracy of its presentation. The illustrations, many in color, have been selected carefully from a wide variety of sources. This new edition should continue to find wide acceptance.

Connective Tissue in Health and Disease. Edited by G. Asboe-Hansen, M.D. Cloth. $15. Pp. 321, with illustrations. Philosophical Library, Inc., 15 E. 40th St., New York 16; Ejnar Munksgaards Forlag, Nørregade 6, Copenhagen K, Denmark, 1957.

Twenty-three contributors from various parts of the world present their views on the timely subject of this book. The editor is director of the Connective Research Laboratory, University Institute of Medical Anatomy, Copenhagen. This volume brings together, under one cover, the present knowledge of connective tissue in its various phases. It covers such aspects as the morphology, chemistry, and pathology of connective tissue. At the end of each paper there is a complete bibliography. The subject matter is well illustrated. Although the book has many contributors, its style is cohesive and easy to read. This is an authoritative book on a vital subject, and it should be of great value to all students of connective tissue, in particular, and to the medical profession, in general.

QUERIES AND MINOR NOTES

VARIOUS ROUTES OF IMMUNIZATION

To the Editor:—*What is the present attitude toward the efficacy of various routes of immunization, whether intracutaneous, subcutaneous, or intramuscular? If tetanus toxoid, 0.5 cc., is given as a routine booster intramuscularly and the same immunization is given by the intracutaneous or subcutaneous route, what would the latter dose be? Is the intracutaneous or the subcutaneous route just as effective as the intramuscular? Is it true that the allergic factor is reduced and that there is less reaction?* *Martin Karr, M.D., San Mateo, Calif.*

Answer.—The efficacy of immunization after intracutaneous injection of the antigen was first demonstrated by Tuft in 1931 with typhoid vaccine. In an experimental study (Tuft, Yagle, and Rogers: *J. Infect. Dis.* **50**:98, 1932) comparing the antibody responses which followed the administration of typhoid vaccine after intramuscular, subcutaneous, intracutaneous, and oral administrations, it was shown that the antibody response after intracutaneous injections of one-tenth the dose (0.1 cc.) was equal to that after a dose of 1.0 cc. injected intramuscularly and was better than that after either subcutaneous or oral administration. Upon the basis of these results, Tuft (*J. Lab. & Clin. Med.* **16**:552, 1931) employed the intracutaneous method for immunization with typhoid vaccine with doses of 0.1, 0.15, and 0.2 cc. at weekly intervals. He showed not only that satisfactory antibody titers comparable with those induced by the usual intramuscular route followed but, more important, that there were much fewer reactions compared with those after the intramuscular route; even those which occurred were local rather than constitutional in nature.

In a later report, Tuft (*Am. J. M. Sc.* **199**:84, 1940) demonstrated that a single intracutaneous reinjection of 0.1 cc. of the vaccine produced satisfactory antibody response in a previously immunized individual. He recommended, therefore, that a single dose of 0.1 cc. be given intracutaneously as a booster dose at three-year intervals because of the minimal reaction which follows. This method of reimmunization has been accepted and is utilized by the armed forces for its military personnel.

Since these demonstrations the intracutaneous method of administration has been employed successfully with many other antigens both in man and animals, e. g., diphtheria toxoid (Kern, Crump, and Cope: *J. Allergy* **6**:525, 1935), scarlet fever Streptococcus toxin (Kern, Crump, Roddy, and Borow: *J. Allergy* **9**:125, 1938), bacterial vaccines in asthma therapy (Tuft and Ermilio: *J. Pediat.* **48**:569, 1956), and pollen desensitization. The dose employed in all these instances for intracutaneous use usually was one-fifth to one-tenth that employed for either intramuscular or subcutaneous administration, the dose for the latter being equal to that for the former. Aside from the satisfactory antibody response which follows intracutaneous injection, the great advantage of this method of administration, regardless of the antigen employed, is the markedly diminished tendency to constitutional reactions. By observing the degree of local reaction directly on the skin, it also is possible better to regulate subsequent injections than if the injection is given intramuscularly or subcutaneously.

So far as this consultant knows, the intracutaneous method of administration has not been used for tetanus toxoid either routinely or as a booster dose, probably because reactions to the latter are extremely rare. If this method is utilized, the dose would be either 0.05 cc. or 0.1 cc. administered intracutaneously. The dose of the tetanus toxoid when given subcutaneously is the same as that employed for intramuscular use.

DIFFERENTIAL DIAGNOSIS IN CHOREA

To the Editor:—*Could the following case history be considered consistent with the diagnosis of prolonged Sydenham's chorea? A 55-year-old woman, born in Russia, was known to have had a severe high fever at the age of 12, while in Europe, that was treated with salicylates and "ice baths." It was apparently not followed by a cardiac murmur at that time. When she was 18 years old, involuntary jerky movements and facial grimacing appeared and persisted, with only brief periods of intermittent improvement until the present time. The movements have gradually become worse. Her other history consisted of rectal "polyp," removed some years ago, and a possible bout of pneumonia during her adulthood. Her family history indicates no mental and neurological disorders. On physical examination her neurological survey was as follows: Her sensorium and orientation are intact. She has no intellectual impairment. There are coarse movements of purposeless character of her head, shoulders, trunk, and, to a lesser extent, of her upper extremities. The head is thrown about in all directions. Her cranial nerves are intact. The fundi are normal, and deep reflexes are diminished and equal. There are no pathological reflexes and no clonus. Her sensation is intact. When she is emotionally upset at the time of examinations and at other times the movements are worse. During sleep she was observed to be quiet. During her hospital stay a few months ago she had a persistent regular tachycardia interpreted on the electrocardiogram as a sinus tachycardia. Her radioactive iodine uptake was normal, so that she was given digitalis and phenobarbital. After her heart rate returned to normal a distinct systolic murmur was heard in the mitral area and a split second sound was noted.*

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications and queries on postal cards cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

At this time, her hemic component was normal but her erythrocyte sedimentation rate was elevated and her C-reactive protein level was elevated once and normal twice. Her venous pressure and circulation time were normal. Her esophogram showed backward displacement and compression at the region of the left auricle. Another observer during a previous recent hospital admission, one month before, heard a definite presystolic murmur at the apex accompanied by an accentuated first mitral sound, and the second pulmonic sound was greater than the second aortic sound. In view of these findings, a diagnosis of rheumatic heart disease in addition to chorea was made.

Arthur M. Parker, M.D., Brooklyn, N. Y.

ANSWER.—This case is apparently one of Sydenham's chorea, since its onset is early in life, there is no history of chorea in the family, and there is no story of progressive intellectual deterioration. Both Huntington's and Sydenham's chorea are diseases of the extrapyramidal tracts. The integrity of the pyramidal tracts is intact, so that motor paresis or hypotonia is present in the afflicted limbs.

The differential diagnosis of these two types of chorea is based upon these important factors: Sydenham's chorea always occurs in children or adolescents. Huntington's is always hereditary and is a disease of middle life. Generally, Sydenham's chorea is self-limiting—although there may be residual tics or habit spasms as a sequel. Huntington's chorea is a chronic chorea that is invariably associated with progressive dementia. The choreic movements are rather typical, affecting face, soft palate, trunk, limbs, and occasionally the muscles of respiration. There are abrupt movements, irregular, involuntary, asymmetric, purposeless, and unrestrained. Most frequently the movements cease in sleep. Emotional stimuli and sudden noise tend to increase the movements.

Sydenham's chorea is also known as infectious chorea, "St. Vitus' dance," and rheumatic chorea. It is not necessary to have a heart murmur present at the time of the acute onset—and many children with Sydenham's chorea never demonstrate heart disease. In this case the Sydenham's chorea is probably on the basis of rheumatic disease, although the cause may in other cases be encephalitis. It is this consultant's opinion that this is a case of Sydenham's chorea, rheumatic type.

INFLUENZA

TO THE EDITOR:—*What are the biological differences between virus A and virus B influenza, and how many recorded deaths, in the United States, were were there in the 1918 epidemic?*

Emil J. Alban, M.D., Torrington, Conn.

ANSWER.—Influenza viruses A and B cannot be distinguished from each other on the basis of their morphology, on their growth in allantoic fluid of chick embryos, or on other cultural characteristics. Determination of these types can be made by the complement-fixation test, but strain differences within each type can be determined only by hemagglutination inhibition tests. In 1918 there were 464,359 deaths from influenza and pneumonia in 33 death registration states, and in 1919 there were 185,440. These figures included deaths in Army, Navy, and Marine Corps personnel located in the registration states. No data are available for either civilian or military populations in the remaining states, but it is estimated that there were at least half million deaths from September, 1918, to March, 1919, during which time the epidemic was most severe.

BLOOD DONATION FROM PATIENT WITH LEUKEMIA

TO THE EDITOR:—*A patient was stricken with acute leukemia and after two weeks of intensive treatment succumbed to the disease. About six weeks previous to the time that he began to experience symptoms, and while he was still apparently well, he donated a pint of blood to the Red Cross. Was the donated blood of any danger to a recipient? How long before symptoms develop might pathological findings be picked up in a blood cell count?*

A. L. Feuer, M.D., Gastonia, N. C.

This inquiry has been referred to two consultants, whose respective replies follow.—ED.

ANSWER.—No doubt many physicians have shared the misgivings of the inquirer and wondered whether a blood donor with undiagnosed leukemia might not transmit his disease to the recipient. Actually there appears to be no need for concern regarding this possibility, since deliberate attempts to transmit leukemia in man have been unsuccessful, and, despite the millions of transfusions given a year in this country alone, there is no recorded instance of transmission of leukemia by a blood transfusion.

The transmission of leukemia is a problem related to tumor and organ transplantation and skin grafting. As is well known, transplants of organs and grafts of skin from one human individual to another will take at first but survive only temporarily. Such grafts die even when the donor and recipient are close blood relatives, except in the case of identical twins. The destruction of the transplanted organ or tissue appears to depend on an immune reaction of the host to foreign antigens in the transplanted cells. The same applies to the transmission of leukemia, because the transfused blood cells must survive and multiply in the body of the recipient if the disease is to develop. Skin and organ transplantation has been successful when the recipient is incapable of an immune response, as in individuals with agammaglobulinemia or in experimental animals subjected to adequate doses of x-ray and/or cortisone.

In animal experiments, tumors and leukemia are readily transmitted from one mouse to another within the same inbred strain. Such inbred strains are produced by brother-sister matings over numerous generations, until eventually every member of the strain is virtually identical genetically, like human identical twins. When tumors or leukemia are transplanted to a mouse of a different strain, the transplants, which grow at first, die, and after the tumor is cast off, antibodies against

antigens in the red blood cells of the donor mouse not infrequently appear in the recipient's serum. A condition for successful transmission of leukemia is that the cells injected be viable. Since for blood transfusions in man the bank blood is at present generally used, and since leukocytes survive for only a short time outside the body, this is another reason why up to now leukemia has apparently never been transmitted by transfusion.

No authoritative information is available regarding how long pathological findings may be picked up in a blood cell count before symptoms of leukemia develop. However, it is not an infrequent experience that a patient being investigated for some other complaint is discovered to have chronic myeloid or lymphoid leukemia by the blood cell count. Since, especially in elderly persons, chronic leukemia may be a relatively mild disease, so that these persons have been known to live 15 to 20 years, it is evident that the hematological findings in the chronic form of the disease may be present for years before symptoms develop. Obviously, in acute leukemia, where the entire course of the disease may last only 3 to 12 months, this statement would not hold.

References

Forkner, C. E.: Leukemia and Allied Disorders, New York, The Macmillan Company, 1938.

Wiener A. S.: Blood Groups and Transfusion, ed. 3, Springfield, Ill., Charles C Thomas, Publisher, 1943.

ANSWER.—There is no evidence that blood from a patient with leukemia, when transfused into another patient, will result in transmission of this disease. Attempts to transmit leukemia experimentally from one human to another have failed. Transfer of this disease in animals has been achieved between members of the same inbred strain and under very special conditions when host and recipient belong to different strains. Such conditions hardly would be encountered among human beings. Chronic forms of leukemia have been diagnosed not infrequently from routine blood cell counts months and years before the patients became symptomatic. A similar lag between hematological changes and symptoms is not likely.

SMALL DOSES OF AN ANTIBIOTIC

TO THE EDITOR:—*Is it considered good therapy in the case of an adult with a respiratory infection, such as chronic sinusitis or bronchitis, to give 62.5 mg. of tetracycline every four hours? What about the use of tetracycline in an acute infection in an adult? What is considered adequate antibiotic therapy in the cases cited above?* *M.D., Maryland.*

This inquiry has been referred to two consultants, whose respective replies follow.—ED.

ANSWER.—The use of such small doses of tetracycline in an adult would not be advisable for treatment of an acute bacterial infection. However, only a small minority of acute respiratory infections are bacterial; most are viral infections in which the antibiotic would have no therapeutic effect. Chronic bronchitis is not primarily an infection but is usually due to inhaled irritants. Secondary infection is usually present, however, and some authorities employ small doses of antibiotics in these cases.

There is serious objection to the use of the wide-spectrum antibiotics for this purpose. It has been shown by Weinstein in tracheotomized patients that use of these agents does not prevent infections, and the infections which develop are serious ones, with drug-resistant organisms, such as the Proteus and Pseudomonas organisms. Penicillin is to be preferred for prolonged use in treatment of chronic infections because its narrower spectrum of antimicrobial activity is a virtue in these circumstances. Infections which develop while a small daily dose of penicillin is taken will, as a rule, be responsive to tetracycline and other wide-spectrum antibiotics in dosage of 250 mg. two to four times daily for a week.

ANSWER.—The administration of 62.5 mg. of tetracycline every four hours in an adult with a respiratory infection cannot be considered as a rational or adequate form of therapy. Unless there is evidence that the infection to be treated is due to an organism sensitive to tetracycline, this or other antibiotics should not be promiscuously used. Most upper respiratory infections are viral in origin, and there is no evidence that they respond to these agents. The use of simpler and potentially less harmful agents would satisfactorily control symptoms and would entail less chance of undesirable side-effects. Assuming however, that the infection was susceptible to tetracycline, one should use adequate doses in order to properly control the infection, and the dosage indicated is inadequate for this purpose. A dose of 250 mg. every six hours would be considered adequate and should be used where indicated.

EXCESSIVE X-RAY THERAPY TO THE SKIN

TO THE EDITOR:—*What are the prophylaxis and treatment in the case of a patient who received too large a dosage of x-ray therapy for a seborrheic type of facial dermatitis four years ago?*

M. A. Wuerschmidt, M.D., Oswego, N. Y.

ANSWER.—The question is very vague. There is not enough information given regarding the degree of radiodermatitis, nor is there any information given regarding the dosage of x-rays received to the face. This is important because, if the x-ray therapy was given four years ago and the dosage was in excess of what the skin could tolerate, then by this time there should be definite radiation changes. The amount of radiation changes depends upon the amount of radiation which was received four years ago. The treatment therefore depends upon the amount of radiation damage which is present now. From the query it is assumed that the radiation changes are minimal at the present time; otherwise, the word "prophylaxis" would not have been used. If the radiation changes are minimal, then, of course, the best thing to do to prevent further damage to the irradiated skin is to protect the skin in every way possible by applying emollients at night; these emollients include cold cream or petrola-

tum or even ointments containing both vitamins A and D. There is no specific topical remedy that can be applied to the face which would cure radiodermatitis or which would prevent radiodermatitis if a dosage of radiation is given in excess of what the skin can tolerate.

In addition to using emollients, the patient who has been irradiated should avoid exposure to ultraviolet rays, both natural and artificial. Sun bathing is bad for such an individual. If he does go out in the sun, then he should apply a sun-protective preparation; there are many such "sun screeners" on the market. It is preferable that a greasy sun screener be applied rather than a sun screener whose base is greaseless. Exposure to extremes of temperature should be avoided. Going out in the cold wind tends to make a person who has been irradiated have a tender skin. The cold wind might even cause fissures to occur on such a skin. Of course, such a person should not have any further radiation. Even the taking of dental films should be kept down to an absolute minimum. If the radiation damage is severe, plastic surgery and skin grafting may have to be resorted to. Perhaps the simplest solution to a problem like this is to obtain the advice of a local dermatologist.

RECTAL ADMINISTRATION OF AMINOPHYLLINE FOR ASTHMA

To the Editor:—*In the treatment of bronchial asthma in a 10-year-old girl, due to tree or grass pollens, is the use of rectally administered aminophylline suppositories dangerous? If not, what preparations and what dosage would be advisable? Would the early use of orally administered antihistaminics be in any way contraindicated?*

Leo M. Smith, M.D., Stamford, Conn.

This inquiry has been referred to two consultants, whose respective replies follow.—Ed.

Answer.—Aminophylline suppositories are not dangerous if used properly. The mistakes which are sometimes made are (1) too large dosage and (2) too frequent dosage. A reasonable dose for a 10-year-old girl is one child's size suppository containing 3¾ grains (0.24 Gm.) of aminophylline. A good rule to follow is approximately 1/20 grain (3 mg.) per pound of body weight. Aminophylline suppositories should not be given more than twice in 24 hours.

Antihistaminics would not be contraindicated, but, as a rule, they are of little value in cases of asthma and work in only about 1 case out of 20.

Answer.—Aminophylline suppositories as administered under these circumstances are not dangerous. There appears to be no contraindication to rectal aminophylline therapy beyond the age of 3 or 4 years, particularly for short periods as during the early pollen seasons.

Dosage should be kept within that associated with nausea or excitement. Suppositories containing 3¾ grains (0.24 Gm.) administered up to twice daily are usually tolerated. Reported dangers in the use of aminophylline rectally have largely occurred in children under the age of 4 years, in whom treatment has been continued in larger than the above dosage or despite the development of nausea or excitement. An idiosyncrasy or allergic-type reaction is of rare occurrence.

Oral therapy with antihistaminics affords little relief of bronchial asthma. Also, sensitization-like reactions are relatively common in patients clinically intolerant to other synthetic drugs or to combustion products of coal, oil, or gas and certain similarly derived materials.

NYMPHOMANIA

To the Editor:—*What are the peripheral or organic causes of nymphomania? Is there any hormonal treatment of nymphomania that is accentuated premenstrually?*

M.D., New York.

This inquiry has been referred to two consultants, whose respective replies follow.—Ed.

Answer:—The most common peripheral organic cause of nymphomania is an enlarged or hypertrophied clitoris, a condition present for example in the adrenogenital syndrome. Any irritative lesion in the vaginal area may also lead to nymphomania. There is no known hormonal treatment for nymphomania that is accentuated premenstrually.

Answer:—Nymphomania, or hypersexuality in women, is primarily an emotional illness and is a behavioral manifestation of an infantile, immature personality. Nymphomania is usually considered to be symptomatic of a deep-seated neurosis in which the individual is unable to obtain satisfaction from normal sexual intercourse. Thus, deprived of real satisfaction, nymphomaniacs strive time and again to obtain pleasure from genital activity. The normal person, by contrast, loses intense sexual desire when the act of sexual intercourse is completed and does not need to repeat the performance excessively.

There are no known organic causes per se of nymphomania. However, it may occur rarely as a form of regressive behavior in chronic brain syndrome due to diffuse cortical disease. Any patient who undergoes a change in personality or character, particularly when sexual discretions are disregarded or sexual activity becomes excessive, should be suspected of having organic brain disease. These patients warrant a complete neurological examination. There is no conclusive evidence that drugs or hormones, particularly the androgens, can cure or significantly alter nymphomaniacal behavior.

SURGICAL SCRUB SINKS

To the Editor:—*In many hospitals it is the custom for personnel in anesthesiology to take the mask and the tubing from the machine at the close of anesthetization to the scrub sinks, where the surgeons scrub up for operations, using the soap from the dispenser and the running water to wash this equipment and allowing the soap and material rinsed from the masks to run down the drain. Since all are concerned about the possibility of pathogenic organisms*

in the nasopharyngeal secretions of not only the operating-room personnel but also the patients, can the use of surgical scrub sinks for cleansing anesthetic equipment be considered good practice?

M.D., Illinois.

ANSWER.—The practice of washing equipment used in anesthetization in the scrub sinks is surely to be condemned. There is no excuse for following this practice, nor is there any excuse for surgeons opening the lower part of the intestine in the sink, as is the case in so many hospitals. Scrub sinks should be used for scrubbing the hands and arms of the operating-room personnel and for nothing else.

SHELLFISH IN THE LOW-CHOLESTEROL DIET

TO THE EDITOR:—*The statement has been made that shellfish contain large amounts of cholesterol-like substances; however, it is uncertain whether these substances are cholesterol or whether they are another sterol which would not be restricted from this diet. What then is the present status of shellfish in the low-cholesterol diet?*

A. J. Freiburger, M.D., Carlsbad, Calif.

ANSWER.—At the present time the low-cholesterol diet has little practical significance. The amount of cholesterol in the body is not dependent upon the amount of cholesterol ingested. Cholesterol is formed in intermediary metabolism from many substances, and any dietary constituent, even carbohydrate, may act as its precursor.

Apparently shellfish, such as oysters and clams, contain a sterol other than cholesterol (Bergmann and Low: *J. Organic Chem.* **12**:67, 1947). These authors report that there is a C_{28} sterol called ostreasterol present in shellfish. It might be pointed out that the fat content of shellfish is of the order of 1 to 2%, and these foods could easily be included in a restricted fat diet.

REPORTING SMALLPOX VACCINATIONS

TO THE EDITOR:—*Please discuss the preferable terminology in reporting the results of smallpox vaccination. Considerable difference is found in the terminology of the Navy and other organizations.*

M.D., California.

ANSWER.—It is difficult to say what terminology is preferred in reporting the results of smallpox vaccination. When complying with the World Health Organization vaccination certificate for travel, a physician has only to report whether the vaccination is primary or secondary (revaccination). Only a primary vaccination must include the additional information as to whether it was successful or unsuccessful. If the physician knows that the person has been vaccinated in the past and that he is administering a revaccination, he is not required to record the result of this revaccination. However, it must be noted that, when a revaccination site is not inspected, there is no actual evidence of immunity. If the vaccine used for revaccination was not potent or if the site of vaccination was not properly prepared, a successful take might not result.

A more accurate way of reporting the result of vaccination would be to use the terminology "primary vaccination," "accelerated reaction," or "immediate reaction." The term "immune" reaction should not be considered, as it has been used by some physicians when they see no evidence of a take. The best clinical evidence seems to indicate that, even after a recent vaccination, revaccination, if properly administered with potent vaccine, will cause a demonstrable lesion at the vaccination site.

A successful take after smallpox vaccination can only be determined by observation of the reaction that occurs at the site of vaccination. If repeated attempts to vaccinate fail to produce any reaction, one still cannot say that the person is immune. Again, actual evidence of immunity cannot be determined unless the site of vaccination is reexamined.

X-RAY TO THE ABDOMEN DURING PREGNANCY

TO THE EDITOR:—*There will no doubt be a veritable flood of letters concerning the answer to Dr. Roy F. Messinger's question about taking routine flat plates of the abdomen in all pregnant patients* (J. A. M. A. **163**:*1659 [April 27] 1957*).

Let physicians refer to the report of the National Academy of Sciences—National Research Council (Biological Effects of Atomic Radiation, Washington, D. C., 1956), to the paper by Stewart and associates (Lancet **2**: *447, 1956*), *or to the editorial on this subject by Drs. Dameshek and Gunz* (J. A. M. A. **163**:838-839 *[March 9] 1957*) *for a more valid appraisal of present information relating to this problem. They will find overwhelming evidence that routine x-raying of pregnant women is contraindicated, not only because of genetic damage due to irradiation of the gonads of both mother and fetus but also because of possible direct injury even from diagnostic x-ray doses.*

If an x-ray is unquestionably necessary in order to manage the patient successfully, it is justified; if there is no positive indication for it, it should not be taken.

M. Ingram, M.D.
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The above comment was referred to the consultant who answered the original query, and his reply follows.—ED.

TO THE EDITOR:—*The taking of a single x-ray plate, presumably where indicated, was the subject of the original query. This consultant is unalterably opposed to x-ray treatment to the abdomen during pregnancy, except perhaps for malignancy under special conditions. As pointed out in the original answer and as is well known, x-ray therapy during gestation has led to irreparable injury.*

The editorial by Dameshek and Gunz, to which the correspondent refers and which is entitled "Diagnostic and Therapeutic X-ray Exposure and Leukemia," says: "It is certainly by no means proved that the various diagnostic and therapeutic x-ray procedures cited above [data from Hiroshima] are clearly related to leukemia in human beings. Nor is it clear how such exposure might lead to leukemia."

This consultant fully agrees with those who insist that, if there is no positive indication for an x-ray picture, either in pregnancy or in the nongravid state, it should not be taken. Hence, x-ray pictures of gravid women should not be taken routinely. A physician should be able to elicit practically all the information he needs about pregnancy, such as breech presentation, multiple pregnancy, abnormal presentation, and also some monsters, without the aid of roentgenography.

There is a marked difference of opinion concerning the harmful effects of radiation. Practically all geneticists agree that x-ray is doing a great deal of harm even when used for diagnostic purposes, but roentgenologists are of a different opinion. Snow (Roentgenology in Obstetrics and Gynecology, ed. 2, Springfield, Ill., Charles C Thomas, publisher, 1952) says: "Roentgenography for diagnostic purposes in obstetrics entails no risk. For each film exposure the maximal energy delivered into the vagina, as measured with an ionization chamber, is 2 r. When five film studies are made, which is the most complete type of study, about 7 r are delivered. This is well within the safety limit." In spite of this optimism there is increased fear that x-ray pictures and certainly nearly all radiation therapy can have dire results. The Medical Research Council of Great Britain has issued a report entitled "Hazards to Man of Nuclear and Allied Radiations" (London, Her Majesty's Stationery Office, 1956). It was found that after heavy doses of radiation a pregnant woman may miscarry or may give birth to a stillborn child. Information from the Atomic Bomb Casualty Commission shows that in Hiroshima and Nagasaki there were higher abortion and stillbirth rates among pregnant women near the explosion than among those at greater distances. There is considerable evidence, both from the case records of patients treated with radiation and from reports published by the Atomic Bomb Casualty Commission, that heavy irradiation of pregnant women can lead to the birth of children who are either abnormal at birth or later develop abnormally. The case records of women therapeutically irradiated during pregnancy list a number of different developmental abnormalities in the children, the most striking of which is microcephaly.

Under modern conditions of occupational exposure, e. g., among radiologists and radiographers, there is no evidence of any impairment of fertility. Furthermore, there is no suggestion that female radiographers suffer from irradiation-induced menstrual disturbances which might be accompanied by diminished fertility. The Medical Research Council has made several recommendations. One is that personal records, not only of doses of radiation received during occupation but also of exposures from all other sources, such as in medical diagnostic radiology, should be kept for all persons whose occupation exposes them to additional sources of radiation. The use of radiotherapy in nonmalignant conditions should be critically examined. The small amounts of radiation from miscellaneous sources, such as x-ray machines used for shoe fitting, luminous watches and clocks, and television apparatus, should be reduced as far as possible.

Simultaneously with the release of this report from Great Britain appeared the report of the National Academy of Sciences in the United States (Science **123:***1157, 1956*). *The recommendations made by both the British and the American committees are similar. Both studies are particularly concerned with the possible genetic damage during the reproductive period of the first 30 years of life, and both calculate the accumulated radiation of the gonads during this time. Both committees have agreed essentially on how much of an increase in radiation it would take to bring about a doubling of the mutation rate in man. However, the American committee believes that all radiation is damaging, while the British believes that the present hazards from fall-out are "negligible."*

DECREASED INSULIN REQUIREMENT

To the Editor:—*In the May 11, 1957, issue of* The Journal, *page 222, in the Queries and Minor Notes, an inquiry was made regarding the cause for a decrease in insulin requirement in a 73-year-old diabetic man who had been receiving 20 to 30 units of insulin. After a stroke resulting in a hemiplegia, it was found that he no longer needed insulin, as evidenced by absence of sugar in the urine and a normal blood sugar concentration.*

This apparent spontaneous remission of diabetes mellitus was explained by two consultants primarily on the basis that the patient's condition was now under better and more proper control and that this was the primary reason for the amelioration of his diabetes. Certainly, improved control under hospital and highly supervised conditions will result in better diabetic control. However, in such situations, involving the central nervous system in particular, one must also consider the possibility that this patient has suffered an injury to his hypothalmus or anterior pituitary gland. I recently had the opportunity to observe just such an individual who, after a hemiplegia, also had a marked remission in his clinical signs and symptoms of diabetes. This case was reported as an example of a spontaneous remission of diabetes mellitus or the Houssay phenomena in man in the Annals of Internal Medicine *(**40:***1230, 1954*). There have been numerous other reports of similar cases. The importance of recognizing anterior pituitary insufficiency as the primary cause for this apparent remission in diabetes is essential, as the*

treatment of such a patient would require full hormonal replacement therapy for the well-being of the patient, and corticosteroids in particular might well be lifesaving.

Marvin E. Levin, M.D.
Washington University School of Medicine
St. Louis.

The above comment was referred to one of the consultants who answered the original query, and his reply follows.—ED.

TO THE EDITOR:—*There is no doubt that cerebral hemorrhage resulting in the destruction of the anterior pituitary would have a profound effect in diminishing insulin requirement, and the correspondent properly points out that such a contingency is worth considering in the kind of case under discussion. Such a combination of lesions, however, is rare, and the probability is that a reduced intake of food accounts for the observed changes in the present instance.*

PATHOLOGY OF MYOCARDIAL INFARCT

TO THE EDITOR:—*In* THE JOURNAL, *March 16, 1957, page 1002, the answer to the query regarding pathology of myocardial infarct closes with the statement, "It has actually been established by historical studies that coronary disease often occurs at progressively earlier ages in succeeding generations of persons with the disease." Dr. Joslin, of Boston, has commented on observing similar relativities with reference to the reproductive transmission and reappearance of diabetes.*

Please supply references in which this phenomenon of coronary disease is reported and, if readily available, any other references concerning similar reappearances of transmissible hereditary pathology at progressively earlier decades in human progeny. This information is important for establishing the illustrative tendencies of various protoplasmic specificities of human family strains in heredity. There already are biological laws explaining the cause of these and other biodynamic phenomena of human heredity. We are seeking additional illustrative examples of comparable trends for the various endogenous constitutional diseases.

Raymond L. Schulz, M.D.
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Los Angeles.

The above comment was referred to the consultant who answered the original query, and his reply follows.—ED.

TO THE EDITOR:—*It has been this consultant's experience on many occasions to encounter families in which three or four siblings, usually male, would have histories of coronary thrombosis. Similarly, it has been observed that patients with coronary thrombosis have had parents in whom there was a high incidence of coronary thrombosis. There have also been observed a number of instances in which coronary disease has occurred in patients at a younger age than it did in their fathers who died of coronary thrombosis, although no documented significant evidence has been published in this regard.*

Pertinent references from the literature of the last few years are as follows:

1. Cassidy, M.: Coronary Disease: Harveian Oration of 1946 (Lancet **2**:587, *1946*).*The author claimed that family history played a notorious part in the etiology of coronary disease among one-half of 100 patients studied.*

2. Gertler, M. M., and White, P. D.: Coronary Heart Disease in Young Adults (Cambridge, Mass., Harvard University Press, 1954). Among significant comments are these: Coronary heart disease runs in families (page 22); it is reasonable to suspect the existence of hereditary genetic factors in the etiology of coronary heart disease; extremely suggestive regarding inheritance (page 23); incidence of coronary disease is significantly greater in the parents of patients (15.0%) than in the parents of controls (5.8%) (page 29); coronary disease is familial (page 31); and difference in age at time of death is not statistically significant (page 68).

3. White, P. D.: Clues in the Diagnosis and Treatment of Heart Disease (American Lecture Series no. 295, Springfield, Ill., Charles C Thomas, Publisher, 1956).

Coronary arteriosclerosis of high degree, causing angina pectoris, coronary thrombosis, myocardial infarction, or sudden death, is notably commoner among the children of parents for whom there is such a history and especially if both parents were so affected in youth or early childhood. Whether the condition is due to familial hypercholesteremia of greater or less degree, to an excessively mesomorphic build which is certainly readily inherited, to a genetic inadequacy of the coronary arterial tree, to hormonal imbalances, to familial gluttony, or to combinations of these or other factors not yet under fire has yet to be determined.

ACHONDROPLASIA

TO THE EDITOR:—*The answer to a query concerning achondroplasia in* THE JOURNAL, *April 27, 1957, page 1660, contains the statement, "This condition is congenital, but it is not in the group of hereditary bone dystrophies." The reverse is true. Studies on achondroplasia cited by Neel and Schull (Human Heredity, Chicago, University of Chicago Press, 1954) indicate that "the trait appears to be due to a dominant autosomal gene of high penetrance" and that "most of the cases of achondroplasia occurring in a population during a given period are isolated instances in the family concerned and hence are the direct result of mutation." Thus, the conclusion that "there is no tendency for increased incidence of achondroplasia in subsequent offspring" may be correct, but it is based on a false premise.*

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